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ABSTRACT

This book suggests ways and means by which the development of campuses can be controlled so that functional goals can be aesthetically expressed. The first section, "Prospectus," defines campus planning, illuminating through historical examples the evolution of the campus as a design form, and describes the conditions that make campus planning so critical an activity. Section 2, "The Campus and Its Parts," breaks down the campus into its constituent physical parts and describes each in functional and aesthetic terms. These chapters describe steps that can be taken in programming and designing the various facilities that make up the whole. Section 3, "Campus Plans," indicates in detail the steps and procedures that have to be covered in preparing campus plans. The section contains illustrations showing how old campuses can be expanded and new campuses developed. The book contains numerous bird's eye structural photographs, architectural sketches, institutional design plans, and floor plans. (SLD)

Campus Planning

by Richard P. Dober, AICP

SCUP presented by The Society for College and University Planning

Richard P. Dober

CAMPUS PLANNING

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1996 FOREWORD

Then and now. A new printing of *Campus Planning*, thirty-four years after the first copyright, gives cause and occasion for retrospection, Since 1962 enrollments in higher education have grown from 4.2 million to 14.9 million in the United States, with an additional 900,000 students projected for 2004. Forty percent of the population now has had one or more years of college or university education. In quantity the exceptions laid out three decades ago have been surpassed. In the interval 1,504 new campuses have been developed, raising the total of accredited venues from 2,128 to 3,632. With that increase came an extraordinary surge of architecture, in sum and substance a cultural phenomenon historically unique.

Qualitatively, a scan of the panorama shows that equally meaningful differences have occurred, with measurable impact on how campuses are developed, improved, and used. University research is the engine of national economic and social advancement. Electronic forms of information technology are now commonplace. Modes of teaching and learning have blossomed with perceptible effect on building function, cost, and location. The conservation and respect for the campus's architectural and natural heritage has added a welcomed dimension to campus design. Not the least, there has been a significant decline in segregration by race and gender. Accessibility has been improved for the handicapped, the impoverished, and nontraditional students. In many parts of the country the campus serves as the local arts and recreation center.

As to methodology, the simplified procedures for projecting needs and satisfying demand—some appearing in *Campus Planning*, reader beware—have been supplanted by sophisticated computerized modeling. Unchanged is this belief and advice: those affected by planning outcomes should be involved in the planning process. Overall, the very existence of the Society for College and University Planning is convincing testimony to the professionalization of attitudes and techniques. The emergence is well-documented in *Campus*, Paul V. Turner's elegant account of the American planning tradition (MIT Press, 1984).

Of places illustrated as paradigms in the first edition of Campus Planning, I think, three decades later, the planned physical development at the Massachusetts Institute of Technology, Stanford University, Union College, University of Michigan, University of Pennsylvania, and Wheaton College support the author's selection. However, our original enthusiasm for the University of Illinois, Chicago Circle, has been tempered by its reality. As to several examples of modern concrete buildings cited for architectural emulation, mea culpa.

Retrospection to introspection via literary deconstruction: from whence the fuel that kindled the fire of authorship? For me, born and raised in Philadelphia, William Penn's town planning principles and the glories of the Beaux Arts movement, such as the Benjamin Franklin Parkway, were early childhood experiences, incorporated in the civics and history curriculum, and made evident in school field trips. The Temple University campus was our local playground.

At Brooklyn College, the "little Bauhaus." Martin James's civic design seminars were influential, as was course work in architecture with Stamos Papydaki (a colleague of Le Corbusier), and planning with Charles Asher (the lawyer for Radburn, and several federal new towns). Visual art studies with Mark Rothko, Ad Reinhart, and Jimmy Ernst, among several inspiring faculty, stimulated ideas not yet exhausted. Military service taught teamwork, tenacity, and survival—useful skills in the groves of academe.

Chronologically, the Harvard University Graduate School of Design honed the rough edges of incipient professionalism, particularly Reginald R. Isaacs (a pioneer in contemporary institutional planning) and Josep Lluis Sert (macroscape architecture). Landscape architect Hideo Sasaki extended not only instruction but later an apprenticeship. Concurrent with the Harvard experience was work with Kevin Lynch as member of his research team on the image of the city project at the Massachusetts Institute of Technology. A University traveling fellowship to study European campuses was delayed six months to as to work on the first city plan for Cambridge, Massachusetts, with the assignment to incorporate the projected growth of the city's institutions. Having been nurtured in an Anglo-American environment that prized books and esteemed writing, *Campus Planning* would thus seem as inevitable as the water from a small brook in northern Minnesota eventually reaching the Mississippi delta. A junior faculty appointment at Harvard and work and discussions with many of SCUP's founders provided the incentives, information, and income.

Teachers, mentors, colleagues, and especially family, I thank you all for your encouragement and contributions, The best aspects of *Campus Planning* come from you.

RICHARD P. DOBER, AICP
Cambridge, Massachusetts 1996

FOREWORD

Technology, urbanization, international causes and national ambitions have led us as a society to give a special place to higher education. Whether as a requirement for survival or simply as a means to the next plateau onto which a maturing civilization must scramble, we have committed ourselves to using colleges and universities for training all our professionals, conducting much of our pure research and providing the main body of community, state and national leadership.

The physical forms which house (and will house) the process of education are self-evidently important. The size of the problem we face in designing these facilities is not common knowledge. Between now and 1975 we will have to duplicate (quantitatively) all the campuses which have been constructed from 1636 to 1963. This analogy is perhaps the quickest way of grasping the dimension of a professional challenge which imposes the highest of responsibilities on this generation. We know that institutions are long-lived. How well we meet the task will be the measure by which posterity will judge us.

My objective in this book is to suggest ways and means by which the development of campuses can be controlled, so that functional goals can be aesthetically expressed with least compromise to the past, the present and the future. In suggesting ways and means by which the expected growth can be constructively accomplished I write as a general practitioner of the art of planning. I am not an historian, an educator nor a scholar. These liabilities are also my assets. My viewing point is that of a participant-observer. I aim at giving a broad view of how campuses are being developed, and how present techniques might be sharpened for better results. Having served as a planner for a university community and having been a consultant to a number of institutions in all sections of the country, I also believe that the crisis of expanding higher education will eventually yield good clues as to how to control the urban environment outside the campus. Where possible I have tried to indicate this connection.

This book is not simply a collection of good photographs of good architecture. Not all the examples are to be emulated. Neither is it a manual and check-list—higher education cannot be so easily categorized. The book essentially attempts to establish a base of departure so that each institution, each planner, each designer might find an individual solution appropriate for the particular problem, as well as general solutions for general problems.

The materials are divided into three sections. The first defines campus planning, illuminates through historical examples the evolution of the campus as a design form, and describes the conditions which make campus planning so critical an activity in the decade ahead.

Section two breaks down the campus into its constituent physical parts and describes each in functional and aesthetic terms. These chapters also include steps that can be taken in programming and designing the various facilities which make up the whole. Several methods for campus planning are used as case examples.

Section three indicates in detail the steps and procedures that have to be covered in preparing campus plans. The section contains extensive illustrations of how old campuses can be expanded and new campuses developed. Special emphasis is placed on the overall design form. The various examples used cover the full spectrum of types of institutions of higher education as well as all geographic regions.

This work could not have been accomplished without the aid and courtesies of a number of people. As much as possible I have identified the sources of all information used, either in captions, footnotes, or in the acknowledgments. Some of the materials used in this book was available only in the form of drafts, memos and privately circulated reports, and I appreciate the confidences exchanged by those who made these available to me. In using both credited and uncredited documents I have accepted the usual author's responsibility of drawing conclusions of my own making, and it should not be assumed that any position quoted or commented on is the official view of any institution or professional.

My interest in this subject was first stimulated by my teachers at Harvard University: Reginald R. Isaacs and Jose Luis Sert; and was further aroused by my former employers Mark Fortune, and later Hideo Sasaki.

The idea of a book was encouraged by Thomas H. Creighton and Thomas R. Mason. Both commented on early outlines and drafts and I am grateful for their response at critical moments.

Important support was given by the TPE Foundation and the Educational Facilities Laboratories, Inc. Without the former the book could not have been completed. A travel grant from the latter enabled me to make on the site studies of a number of important campus plans, and in turn furnish the book with significant examples of current work.

Miss Katherine McNamara was most helpful in locating source materials and I am most grateful to her and all the librarians at Harvard University for the use of their facilities. Elizabeth A. Duffy, Sally Hopkins, Lawrence H. Fauber and Kathe DeMay provided valuable secretarial and staff assistance in preparing the manuscript and in research. Muriel Cooper faithfully translated the author's requirements into a professionally designed book. At the Reinhold Publishing Corporation, G. G. Hawley and Jean Koefoed guided the author through the shoals of syntax and scholarship.

My wife's support was constant, both in the mechanical tasks of completing a manuscript under a tight deadline and in giving practical advice and good cheer.

RICHARD P. DOBER
Avon Hill • Cambridge, Mass. • June 1963

DEDICATION: FOR E. L. D.

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I. PROSPECTUS

1. Outlook

"The world is engaged in a desperate, unprecedented struggle to harness knowledge for the advancement and for the very preservation of mankind."

Henry T. Heald—1960
—*Knowledge in the Service of Mankind*

11

Table 1. Enrollments – Fall 1959-62

	IN DEGREE PROGRAMS AT ACCREDITED INSTITUTIONS	STUDENTS REGISTERING FOR FIRST TIME IN DEGREE PROGRAM
1962	4,206,000	1,038,000
1961	3,891,000	1,026,000
1960	3,610,000	930,000
1959	3,402,000	827,000
1951	2,000,000	—

Source: *Opening (Fall) Enrollment in Higher Education, 1962: Institutional Data.* U. S. Department of Health, Education and Welfare, Washington, 1962.

AT THIS MOMENT IN TIME

Desperate and *unprecedented:* these are the key words coming forth from many discussions about higher education in the 1960's. The causes of the alarms are fairly simple; the remedies, quite complex. This chapter summarizes those general circumstances which affect campus planning—circumstances which are likely to increase the need for campus planning in the critical decade just ahead.

The desperate issues cluster into four areas: what should higher education do? How can it be adequately financed and administered? What is the proper content of the curriculum? How can good faculty be attracted, developed and held? The unprecedented aspect of all this is not that these questions have emerged whole and entire at this particular moment in time, for these dialogues in diverse yet similar ways have had a long and honorable place in American history. Rather it is the simple fact that there are more people than ever eligible for education and there is no prospect that their numbers will diminish. Furthermore, there is evidence that a growing percentage of the population desires some form of education beyond the twelfth year. In 1951 twenty-four per cent of the age group 18-21 were enrolled in higher education; in 1961, thirty-seven per cent. In addition, it is national policy that any discussion of physical plant expansion to meet these increasing enrollments "will wisely proceed from the initial assumption that provision will have to be made in one way or another for projected numbers of college students."[1]

Unquestionably there has been a great surge, for enrollments have doubled since 1951. The opening semester figures for the years 1959 to 1962 show a continuing rise. This is not a tidal wave, which implies a peak and then a trough behind it, but a steady growth.

What is Higher Education?

The higher education which is accommodating these numbers is not "unitary but multifarious . . . everything from a classical education to the acquisition of the simplest nonintellectual skills has found a place in the range of educational goals and in the educational structure that stretches from great universities and traditional colleges to teacher's colleges . . . and adult education divisions. American higher education has done everything from providing a marriage market for nubile females to producing the atomic bomb."[2] Obviously there are wide differences in quality and character among the institutions of higher learning.

An appropriate scale for measuring and evaluating higher education is not easily determined, since no one agency, public or private, has the responsibility for the supervision of higher education. Some states exercise control over higher education only by reserving the right to decide who will issue degrees. In other states public institutions have little to say about the appropriations made for operating costs and faculty positions, and such institutions are thereby affected in their curriculum. But for the most part considerable latitude and autonomy are given to institutions in all states.

The number and type of accredited institutions gives a good clue to the scope of higher education. Accredited institutions are those schools that have voluntarily banded together to set and keep certain standards which are established in the self-interest of the group.

To ensure the quality of education offered under the various Veterans' training and National Defense acts, Congress assigned to the Office of Education the responsibility of publishing lists of the accrediting groups. As it stands, the Federal government accredits the accreditors. The Federal standards are:

1. The accrediting agency should be national or regional in scope of operations.
2. It must serve a definite need for accreditation in the field in which it operates.
3. It must be free from prejudice in its in-

dependent judgment as to the quality of the educational program.

4. Having established standards, it accredits only those institutions which have been examined and found to have met the standards.

There are six regional accrediting agencies, about thirty agencies that give national accreditation to professional and technical schools, and in addition, forty-two states and territories with some type of accrediting standards within their own borders.[3]

In the school year 1961-1962 there were 2,040 institutions accredited by one or more of the accrediting agencies, and it is these which most people refer to as higher education. The total represents an increase of 135 schools over the number reported in 1955-1956, and 65 more than those reported in 1960-1961. Some of the increase is due to the accreditation of schools which previously did not meet the standards, and some of it represents new institutions.

A description of academic degrees offers some insight into higher education today, since degrees are the official recognition for the completion of a course of study. There are four principal types, each representing a different level of achievement.

1. *Associate*. This degree is usually awarded on completion of two years of college level work beyond the twelfth grade. In the United States the Associate's degree is less than a hundred years old, having been first granted at the University of Chicago, where President William Rainey Harper inaugurated the junior college curriculum. In more recent times the degree has been given also for study less than four years in length at all types of institutions, and no longer can be considered solely a junior college degree. Approximately 40,000 Associate's degrees are issued annually, a third of these in California.

2. *Bachelor*. This is the oldest degree in America, first conferred in 1642 on the graduating class at Harvard College. It usually represents four years of college level study. Up to 1800, all the colleges in the United States averaged about fifty-eight bachelor's degrees a year. Today about 400,000 are conferred annually.

3. *Master*. This degree generally represents one to two years of study beyond the baccalaureate, though in the case of professional schools the training period may be longer. About 70,000 are granted each year.

4. *Doctor*. As in Europe and South America, this degree covers advanced training for the various professions as well as recognition for research. The most advanced degree conferred, it represents about three years of study and a dissertation. The most important of these degrees academically is the Doctor of Philosophy degree, first granted in the United States at Yale University in 1861. About 10,000 doctorates are awarded each year, ten per cent of them to women.

Attesting to the diversity of higher education is the fact that there are over 1600 different names for the four types of degrees, ranging from the simple Adjunct in Arts to Doctor of Zoology.[4]

The institutions which offer these degrees can be classified by function or curriculum. They are:

1. *Universities*. Institutions which confer both bachelor's and advanced degrees in the liberal arts and the sciences, usually stressing graduate work, research, and professional training.

2. *Liberal Arts Colleges*. Institutions which place a major emphasis on undergraduate education.

3. *Independent Professional Schools*. Institutions which offer professional training but are not part of a university. These can be grouped by subject area and emphasis, such as technological schools, teachers' colleges, theological schools, art schools, law schools, medical schools, and others.

4. *Junior Colleges*. Institutions offering at least two years of training paralleling that of a liberal arts college, but not granting a bachelor's degree or equivalent recognition. Terminal vocational education is another important aspect of the junior college movement.

5. *Community Colleges*. Institutions offering a formal course of studies beyond the twelfth grade but not leading to a bachelor's degree.

The number of accredited institutions in each category is shown in Table 2.

Table 2. Number of Accredited Institutions by Type of Institution — Fall 1960

Universities	143
Liberal arts colleges	764
Independent professional schools	544
Junior colleges	524
Community colleges	(estimated) 153

Sources: *Opening (Fall) Enrollment in Higher Education, 1960 Analytic Report*. Department of Health, Education and Welfare, 1961.
Criteria for Establishment of 2-Year Colleges. Department of H. E. W., 1960.

Table 3. Average Enrollments by Type of Institution

Universities	10,845
Technological schools	2,140
Teachers colleges	1,814
Liberal arts colleges	1,345
Junior colleges	866
Other professional schools	730
Schools of art	337
Theological schools	238

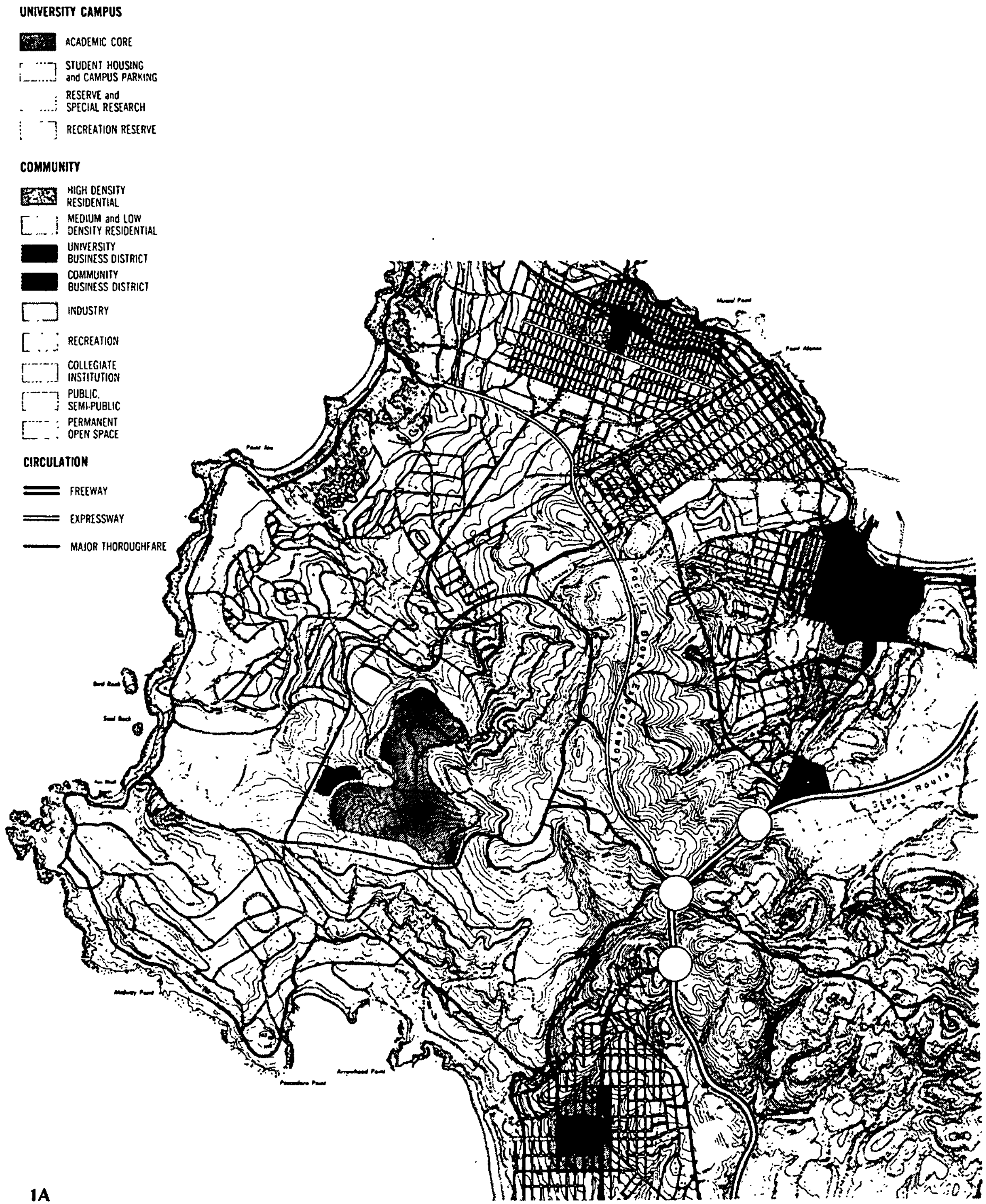
Source: *Opening (Fall) Enrollment in Higher Education, 1960: Analytic Report*. Department of Health, Education and Welfare, 1961.

Enrollments

Almost four million students were enrolled (1960) in degree programs at accredited institutions. Seventy per cent of the students in higher education matriculated at colleges and universities. Teacher's colleges and junior colleges each accounted for ten per cent of the enrollment, and the remainder were distributed among the other types of institutions.

The percentage of students in private schools has been decreasing slowly since the beginning of the century. Sixty out of a hundred students are now enrolled in publicly controlled institutions. If teachers' colleges and junior colleges are excluded, however, the enrollments are split about equally between private and public schools.

Universities and technological institutes have the highest average enrollments per institution. Because they offer specialized courses and advanced degrees and support research, the unit cost of instruction is high; thus large enrollments are required to sustain these facilities. Teacher's colleges and liberal arts colleges are next in order, then junior colleges. Not so well known is the fact that there are three junior colleges with enrollments over 10,000, and fourteen junior colleges with over 5,000 students matriculated. The average enrollments by type of institution are shown in Table 3.



1A

1
Interdependency
The campus cannot be planned independent of its environs. The larger the academic enterprise, the greater the need for adequate consideration of the long-range requirements of both. To assure a healthy growth at least the land-uses, topographic features and circulation elements need to be examined and organized into a design form which recognizes the interdependency.

1A
University of California
South Central Campus Site Selection Study
Lawrence Livingston Jr. and John Carl Warnecke

Physical plant characteristics

The Federal government's 1956 facility survey shows that campuses range in size from less than one acre to over 4,000 acres.[5] Table 4 lists the average number of acres by type of institution. Publicly supported institutions tend to be larger than private institutions, mostly because of lower tuition costs, and because they acquired large acreage under the various Federal and state land grant acts. However, private institutions enrolling fewer than 1,000 students tend to have more acreage than public schools in the same enrollment category (Table 5), partially because the older private liberal arts colleges of small enrollments were started in all sections of the country at a time when large tracts were available at small cost.

As the educational enterprise has grown in recent years, there has been a tendency for the larger universities to construct satellite campuses to accommodate their needs. These are devoted to some aspect of the institution's program, but are not contiguous to the central campus. Examples of these are:

1. Cornell University has agricultural and biological research stations at Kirkland and Geneva. It maintains medical programs and an automotive crash program in New York City and has its aeronautic laboratories in Buffalo.
2. Indiana University operates its own fleet of airplanes to ferry instructors from the main campus at Bloomington to outlying educational centers at Gary, Fort Wayne and South Bend.
3. Almost a third of Princeton University's land holdings are taken up by the James B. Forrestal Research Center, a satellite campus of imposing industrial scale, sharply contrasting with the gray stone, red-bricked buildings and tree-covered lawns around Nassau Hall. (For an air view, see page 96.)

Buildings and their condition

Colleges and universities in the United States in 1957 occupied more than 40,000 buildings. Approximately 22,000 were operated under public auspices, and about 18,000 were privately controlled. Two-thirds of the public buildings and about one-half of the private buildings have been constructed since 1940. Ten per cent of the privately controlled buildings were occupied prior to 1900, compared with only four per cent of the public buildings.[6] These figures follow the general decline in private education enrollments.

As a planning problem, the condition of these older buildings is no less important than the obligation to build new facilities for future enrollments. The annual appeal by a group of midwestern universities to their state legislature summarized the almost universal situation facing many schools:

". . . use still is being made on campuses of the four institutions of 87 temporary buildings and facilities, many of them fire hazards. These include converted military barracks, warehouses, and quonset huts, all expensive to operate and maintain . . . numerous classroom and laboratory buildings in use 50 or more years need rehabilitation for continued economic useage . . ."[7]

Most schools of any size still have their "veterans' village" housing a portion of their married students in structures which on any other site would be classified as sub-standard dwellings. The durability of the "temps" for educational purposes can be seen on the campus at the University of Colorado, where some of the sheds and buildings date back to World War I surplus. Fortunately, these particular buildings are scheduled for demolition and replacement.

A sample of building conditions across the nation (1957) shows that twenty-two per cent of the private buildings were in poor or unsatisfactory condition.[8] This is probably a conservative figure, as the surveys were self-administered by each institution and the definition of safe and adequate facilities is touchy and embarrassing. This is especially so for the "have-nots" who must still compete for *quality* students to make their own advances in education, and would be hampered in recruiting students if the condition of their physical plant were given too strong a light.

The campus buildings can be subdivided into various categories according to functional definitions. Section II describes these categories in detail.

Table 4. Average Number of Acres of Developed Campus

	PUBLIC	PRIVATE
University	453	280
Independent technological institute	191	47
Theological schools	–	19
Other independent professional schools	13	8
Liberal arts college	178	56
Teachers college	60	15
Junior college	30	36
Aggregate United States	154	61

Source: *College and University Facility Survey Circular No. 603*, page 28. Department of Health, Education and Welfare, 1960.

Table 5. Average and Median Number of Acres by Size of Enrollment

	AVERAGE		MEDIAN	
	PUBLIC	PRIVATE	PUBLIC	PRIVATE
Enrollment below 1,000	14	38	10	30
1,000-4,999	172	97	69	68
5,000 and over	597	599	270	92

Source: *College and University Facility Survey Circular No. 603*, page 29. Department of Health, Education and Welfare, 1960.

THE PRESENT STATE OF PLANNING

Since the general conditions of physical plant are fairly well known and the anticipated increases in higher education enrollment fairly well confirmed, what is the status of campus planning?

A poll of 1300 representative institutions in 1956 indicated that a third of them had no plans for expansion beyond five years, and that two out of three had given no thought to physical plant needs beyond a ten year period—all this despite the well-realized knowledge of what was to come in the way of enrollments.[9]

In another survey taken the same year, only twenty-five per cent of the institutions replying to a national survey were able to indictate that a study of space utilization—which is basic to any planning—had been made.[10] Taken as a whole, until very recently few institutions have had an accurate inventory of their physical plant or its theoretical capacity.

In examining the national scene in 1961, Algo G. Henderson noted three cycles of activity in higher education in the post-war period: collaboration, competition, and co-operation. The first occurred in the sharing of facilities to help take care of the returning veterans. When the "wave began to ebb, the institutions temporarily had excess facilities and began to engage in intensive competition, especially for students." (One college in Texas went as far as to declare that it would give any kind of course at any place if ten or more people would enroll in it.) Now that student enrollments are again rising, there is an aura of collaboration and co-operation "because the number of students seeking college today is sufficient to utilize much more fully than ever before all the available facilities.'"[11] Out of necessity the gap between the intention to plan and the act of planning is slowly being closed.

Significant work in campus planning has been done in California, Minnesota, Maryland and Colorado, and the usefulness of these studies is shown in the quick acceptance the studies have had as a basis for planning in other sections of the country. At the regional and state level, co-operative efforts are producing significant data and ideas on how elements of the physical plant can be planned and designed. Occasional studies released by the Educational Facilities Laboratory, Inc., are serving *interregnum*, and giving incentive to many institutions to plan well. Individual schools here and there have launched excellent planning programs; indeed, this book would not be possible without the use of case examples from these places. All this is encouraging. However . . .

As in any emergency-forced situation there are several dangers that institutions face in using these studies as they rush ahead to make up for lost time. Planning standards used at one institution can be misleading when applied to another, since such factors as educational programs, size of student body, resources for development, attitudes and traditions in campus housing, even climate, are significantly different from place to place. A unified theory as to what constitutes the best relationship between numbers of students and types of curriculum and kinds of physical facilities existent or required has yet to be developed. In urban design important theories are emerging from comparative studies of the physical structure of urban localities; similar basic research is needed in campus planning. Until the body of research on campus planning is enlarged, some of the physical planning now being accomplished can be likened to the distortions proverbially attributed to the five blind men who have seen and described an elephant for the first time. If one-third of the 35 million people expected to be added to the population by 1980 are to attend colleges and universities, it would seem appropriate to call now for greater efforts in basic research in campus planning theory and development techniques.

As a broad, cross-country statistical base, the forthcoming national inventory of college and university facilities will make a major contribution to planning. The Federal survey will cover eighty-four per cent of the total number of accredited institutions known to be offering programs in higher education in the fall of 1957. This represents ninety-five per cent of the total enrollments at that time. The size of this undertaking is apparent in the time it has taken to assemble and correlate data. If the Federal statistics can be continued as a perpetual inventory, planners and educators will have a significant tool for measuring what has been accomplished and what has to be done.

Preliminary reports on the Federal survey indicate that many a stereotype as to the present condition and use of campus facilities is due for revision. For example, only one out of three full-time students is housed on campus. Only nine out of sixteen institutions have gymnasiums, contradicting the assumption that colleges and universities are preparing sound bodies as well as sound minds. Less than sixteen per cent of the total enrollments in the fall of 1957 could be seated at one time in the library facilities, as opposed to the general theory that thirty per cent is an optimum figure, and that independent study, which is to accompany the general upgrading of all higher education, should bring with it library buildings that can accommodate fifty per cent of the enrollments. And it will be a surprise to many to learn that one out of five junior colleges, which are expected to take a major part of the educational burden, shares its present facilities with institutions of less than a college grade. This sharing takes place despite the widespread conviction among educators that separate facilities are desirable and necessary.

THE TASK AHEAD

The great expectation: students

The outlook for campus planning can be described in three ways: first, by examining enrollment projections; then by evaluating what these mean as to physical plant; and, finally, by making a common sense judgment as to what conditions or events will affect these prognostications.

Projections of future enrollments are based on the assumption that the age group 18-21 comprises the college age group in the United States. Few students under 18 are enrolled in higher education, while many students over 21 are enrolled in graduate courses. By and large, however, the correlation between the total age group 18 to 21 and the number of people in that age group in attendance at colleges and universities is believed satisfactory as a base for projection.

By a ratio method, a percentage relationship between the two groups can be established. Two types of projections can be made, one assuming a constant relationship between the groups in the years ahead, and the second assuming a continuance of the trends in enrollment of the last ten years.

Using the 1960 census data and actuarial tables as to survival, Dr. Ronald B. Thompson has made enrollment projections for the years 1961-1978 for both the individual states and the United States.[12] Dr. Thompson's techniques have in the past produced on-target estimates. In 1954 he anticipated an enrollment of 3,616,000 for the year 1960; the actual enrollment was 3,610,000. His last report, prepared in 1960, estimated a 1961 enrollment of 3,933,000, and the announced enrollment was 3,891,000.

Dr. Thompson's projections for 1970 enrollments are shown in Table 6, as well as a second projection made by the Department of Health, Education and Welfare. Unless there are drastic changes in the mortality rates, or in social and economic conditions, or war, or a lessening of the desire for education beyond the twelfth year, the conservative estimate for total national enrollments in 1970 is about 6,000,000 students.

What is true for the nation does not necessarily hold for all institutions, particularly private schools which have the alternative of controlling their size and growth, and public institutions located in regions where there are strong migrations in and out of the state. In these cases the national expectations for growth will not come to pass in the same magnitude.

Dr. L. J. Lins, of the University of Wisconsin, has prepared an excellent critique and explanation of the various ways in which refined projections can be made for individual institutions. He believes that the national estimates cited above are correct "in indicating that, collectively, higher educational institutions can expect substantial increases in enrollment. It is questionable, however, that these projections can be interpreted (locally) in terms of how much this increase will be."[13]

It also appears that more high school graduates go on to college in certain areas simply because a new campus has been built. Needs and desires may be outpacing planning. An analogy can be made to turnpike construction. The very existence of the facility attracts users, who tend to put it at capacity long before the time estimated in preliminary projections. Everett Junior College in the state of Washington was planned for an ultimate size of 1,200 students. It opened with an enrollment of 1,500 and quickly jumped to 2,100. A similar situation occurred in California at the San Fernando Valley State College where 3,500 students turned up before the first permanent building had been completed. The admission standards at the Berkeley and Los Angeles campuses of the University of California have steadily been raised, yet the institutions continue to draw relatively larger proportions of their students from their immediate vicinity. Thus, new campuses not only tend to divide the current enrollment among a greater number of institutions, but also tend to increase the absolute numbers of people who go through the higher education system.

Table 6. National Enrollment Forecasts for 1970

Thompson, A.[1]	5,455,625
Health, Education and Welfare[2]	6,000,000
Thompson, B.[3]	6,816,905

Source: (1) and (3) are taken from *Enrollment Projections for Higher Education 1961-1978* by Ronald B. Thompson, 1961.
(2) is taken from page 12, *Opening Enrollment (Fall) in Higher Education 1960: Analytic Report*. Department of Health, Education and Welfare, 1961.

Distribution of enrollments

From 1939 to 1960 there was an increase of approximately 2.2 million in the total number of students enrolled. Over that entire period eighty-six per cent of the increase was accounted for in enrollments in four-year institutions. However, year by year this figure has dropped from eighty-four per cent in 1955 to seventy-nine per cent in 1960. This is accounted for by the rapid growth of the number of junior colleges and their total enrollments.

All institutions are expected to expand, though no one knows for sure the percentage of expansion that each will individually assume. The significant trend is that students are enrolling in public institutions at a faster rate than in private institutions. This abdication by private schools is apparently not one of desire but lack of resources.

"...Smith College possesses neither the space nor the money to double its numbers, even if this were considered desirable...coordinate or co-educational (may be) a more practical step for a men's college or a university than it might be for a residential women's college located in a comfortably small town. In short, the past is always with us, as determining in a physical sense as it is in the entailed responsibilities which it hands down . . ."[14]

The President's Report—1961
—*Thomas C. Mendenhall.*

The distribution of enrollments between private and public schools shows extreme regional variations. Those sections of the country that are oldest and have the longest history of higher education have the highest percentage of enrollments in private institutions. Those sections which have had most of the "population explosion" and shorter histories are relying on public institutions. For example, Professor Seymour E. Harris believes that by 1970, ninety per cent of California's students will be enrolled in public colleges or universities.

National forecasts have also been made of enrollments by males and females in the age group 18-21. At present five out of eight students enrolled in degree programs are men, and three out of eight are women. The percentage of women enrolled has climbed steadily since 1945, though it is not yet near the 1919 peak when forty-seven per cent of the total enrollment was female, and the 1939 figure which was forty per cent. The significant factor is that more men than women are now enrolled in higher education, but the possibility of a percentage increase in enrollments in the age group 18-21 is relatively greater for women than for men. This is a good example of a variable that needs tracking in long-range campus planning.

A significant shift upward in women's enrollments will mean a higher percentage of students housed on campus, and higher gross total of square footage of housing to be constructed, as women's housing averages 50 square feet per student more than men's. In chain-like fashion, other parts of the campus plan would be affected: playfield requirements on one hand, and on the other, an increase in instructional facilities for courses traditionally enrolling mostly women, such as nursing and home economics.

Science and technology as an impetus to campus growth

While population growth itself will accelerate enrollments, another set of circumstances is equally likely to advance the requisites for higher education. Where the wealth of a nation was once measured by capital and population, a truer scale of progress today lies in its capacity to promote research in science and its application to technology.

There is a correlation between the numbers of people holding degrees and the distribution of the benefits of science and technology. Since 1900 the amount of horsepower available per worker has increased ten-fold. Productivity is such that one worker today can produce three times the goods that he could sixty years ago, and with greater variety. Productivity and power have resulted in reducing the work week from sixty to forty hours.

New machines, improvements in fertilizers and the application of "factory methods" to the land have made it possible to feed the nation with fewer farmers. At the beginning of the Civil War, eight out of ten people were engaged in agriculture; today, only one in ten is so employed. The rural exodus from farm to city, plus industrialization, has led to urbanization, and now the megalopolis on the eastern seaboard.

This attenuated form of urbanism and culture may be the grand culmination. For here, as the French geographer, Jean Gottman, has pointed out with great lucidity and insight, on land not unusually blessed by nature urban man has built a "dynamic hub, the most active crossroads on earth, for people, ideas, goods, extending its influence far beyond national boundaries."[15]

The laboratories of the universities and professional schools have made great strides in reducing infant mortality. Epidemic diseases such as tuberculosis and infantile paralysis have either been eliminated or are well controlled. Though accidents and the attritions of a sedentary existence have moved up to the ten top causes of death, the average life span of the population has leaped from

forty years to seventy years. Science is on the verge of understanding and synthesizing life itself in protein matter and photosynthesis.

The roles of colleges and universities in making further contributions through research show no signs of abatement. Scientific knowledge is said to be doubling every ten years. A common index to the growth of knowledge is the number of scientific journals published. There were a thousand in 1850, and over a hundred thousand in 1960. Many of these journals and contributions can continue only within the structure of higher education. With the application of cyberretics further extension of knowledge is in sight. Man has added to his sensorium and established a new symbiotic unit: man and machine. The scientist, Walter A. Rosenblith, has suggested that "just as the microscope, the telescope, the vacuum pump and the galvanometer helped open up new areas of research, the technology of computers and automata—for whose behavior we have no general theory—makes it possible to deal with specific problems that we previously had to consider outside our reach."[16]

In significant ways, observable if not measurable, colleges and universities will thus expand for important reasons other than increasing numbers. Already moving toward the center position of stimulating most technological advances, they will in time provide the solutions to societal problems which such advances invariably (but temporarily) engender. An enlargement of the vision as to what is desirable in these areas, or a dramatic change toward a more peaceful use of the surplus of our national productive enterprise, might bring about further reconstitution of institutional roles and objectives. For example, research and community service may detach itself from the campus in the form of special institutes. The college and university's role as a leisure time and recreational resource (now carried on more by default than purpose) may be accomplished through other types of community facilities.

THE COSTS OF EXPANSION

In 1961 it was estimated that about 18 billion dollars will be expended in the next ten years for the construction of facilities for higher education.

Of this amount 1.5 billion dollars will be allocated for renovating or replacing the backlog of worn out, obsolete and outmoded facilities. About 12 billion dollars will be spent on new instructional facilities and 5 billion dollars on new residential buildings.

These are informed guesses made at the national level,[17] cross-checked against partial studies by states and individual institutions, mostly based on data four to five years old at the time of the survey, and colored by the uncertainty as to what constitutes a good balance between instructional and residential facilities.

A central issue in any review of costs is how to finance this growth. The anticipated expenditure of $18 billion is two and a half times the total monies spent for physical facilities in the previous ten years. Expenditures are now slightly over $1 billion per year. Extrapolation of the historic sources for physical plant funds—government appropriations, direct tax levies, non-federal bonds, gifts and grants—would produce $13.5 billion, leaving a shortage of more than $5 billion. There are strong differences of opinion as to where and how this money can be raised.[18]

Some educators believe that the Federal government is the prime source for funds to fill the gap. John D. Millett, President of Miami University (Oxford, Ohio) has testified:

". . . I stress that the time for action is now. College buildings require something like two years lead time from authorization to completion, as a minimum. Enrollments in higher education were 3.5 million last fall (1960). An increase in one million in the next five years represents about 30 per cent growth. Some of this can be absorbed, in some institutions, by greater efficiency of plant utilization, by making heavier use of facilities in the summer, and by other devices. The fact remains that a drastic expansion of facilities is needed, and that Federal resources are needed to make it possible. Any delay in effecting Federal programs now will, in my opinion, deny higher education to many students in the next few years."[19]

Other points of view suggest that there are sufficient funds from sources other than the Federal government which "should meet the needs in the next decade of the 55 per cent increase in enrollment . . . the combined capacities of State-local governments and private resources can and will meet the needs of America's youth for education beyond high school."[20]

Concern has also been expressed that the use of Federal monies 'would constitute a critical step towards Federal direction of the course of American higher education. Our colleges and universities have thus far been controlled by diverse State, community and private judgments, and through the latter, academic freedom has long been maintained."[21] Those holding this view believe that Federal aid would hinder academic freedom, and that this is too high a price to pay for expansion.

The extent of need varies in different parts of the country. The rapidly growing regions are faced with large capital investments in a relatively short period of time for water systems, public transportation, highways, hospitals and other community facilities, as well as elementary and secondary education. Perhaps some of the anticipated burden can be picked up by encouraging a reversal of the trend away from private institutions. With an impending crisis, fresh thought is needed as to how this can be done. Government support for expanding private institutions might be less expensive than what appears to be a solid commitment to public institutions.

States may even "export" students to less populated areas. At Stanford University, about one out of four undergraduates spends a year in study abroad. An extension of this idea may help spread the total construction required over a longer period by reducing quantitatively the number of students to be accommodated on campus at one time.

As another useful measure, secondary

education might be strengthened by raising the quality of elementary education; thus the content of the junior college curriculum would be sufficient for a larger number of students who need and deserve education beyond the twelfth year, and who would find it satisfactory not to go beyond the fourteenth year.

Some observers believe that the total construction costs may be reduced by greater utilization of facilities, by developing cheaper methods of construction, and by the introduction of new instructional techniques which may reduce the total square footage of space occupied by each student. However, excessive scheduling of facilities may cause operating costs to soar, and cause other diseconomies. A point to be debated (not here) is whether or not an accelerated program of learning will produce desired results—and to what extent a legitimate pursuit of knowledge in the traditional methods can be mechanized and pushed ahead to make way for an equally diligent pursuit.

The total estimate of construction costs in the decade ahead may be actually low because of shifting conditions outside the institution's control; for example, the accepted estimates of percentage of students to be housed, especially married students. The average age of first marriage continues to fall; in the last census twenty-two per cent of the college age group were married. At the larger universities the proportion of married students on campus is about twenty-five per cent of the total enrollment. Further, a number of these families have children—sixty per cent in one western university.[22] Caught between the increased costs of education and the necessity of lengthening the period of training for professionals and technicians, this segment of the student population may require more institutionally provided housing than previously considered reasonable. As will be detailed in Section II, Chapter 7, the entire philosophy of college and university housing is open for review and adjustment.

In examining the probable sources for development it is worth noting that higher education is big business, and its continuing growth is a national asset. A study sponsored by the Federal Reserve Bank of Boston compared the total current funds income of institutions of higher learning in New England with the 1960 net sales of selected business enterprises.[23] While the current income was small in comparison with the industrial giants such as General Motors and United States Steel, it did exceed selected industries of national and regional importance, such as Raytheon and Gillette Corporations. Adding capital plant construction outlays and current expenditures for salaries, supplies and student services, New England institutions of higher education generated about $550 million a year, and represented an important contribution to the regional economy.

Whatever the sources may be, from all point sof view a $20 billion dollar investment in new facilities seems probable and possible in the decade ahead. In addition, it is probable that this expansion will also engender the development of physical facilities comparable to, but quite independent of, higher education as defined so far. A rising tide lifts all the boats. What we have in mind are nondegree institutions: adult education, industrial, technical and service training schools.

Outside our borders

The United States' predicament is not unique, but part of a world-wide pattern. Other countries are far worse off. Though the populations are about the same, there are ten times as many students in the United States as there are in Latin America. Where the United States spends more than $1000 per student in higher education, Latin America spend only $200. The rate of productivity in South America has not kept up with the growth in population, and the provision of higher education lags behind both. The consequences are extreme. For example, the autonomous University of Mexico, designed for 45,000 students in 1951, now accommodates 60,000 students, with all the attendant problems of cramped space and inadequate facilities. Similar situations occur at the University of Chile, the University of Rio de Janeiro, the University of Panama and other large centers of learning.[24]

In Great Britain universities have doubled their enrollments since the end of World War II. Plans have been announced to expand from the present figure of 106,000 to 135,000 by the mid-1960's, and to 170,000 by 1970. This will be done because of the rise in the birth rate, because of the increase in the number of those who are qualified for admission to higher education, and in particular because of the need to increase the number of scientists and technologists. Two-thirds of the proposed growth will be in the areas of pure science and technology.[25]

In 1957 the French government created a relatively new institution of higher education—*collège universitaire*—to meet the problem of the rapidly increasing numbers of students, particularly in the field of sciences. Large cities not possessing university facilities were given priority for new construction, for example, Amiens, Rouen and Tours. Fourteen new institutions have been opened since 1958. Forecasts for higher education indicate an exceptionally rapid expansion, from 192,500 students in 1950 to 505,000 in 1970. As a first step budgets have been approved for 7,000 teaching and administrative positions in higher education.

In 1962 it was estimated that 9,000 dormitory rooms would have to be built in metropolitan France—and like an echo of the United States debates on higher education, it was declared that only 4,000 rooms could be financed.[26] Comparable pictures could be drawn for Germany, Japan—indeed, for any country which is moving with the tide of industrialism and science.

Summary

It is anticipated by many that colleges and universities will double their enrollments in the next decade. The nature of this expansion is not entirely clear. The necessary planning has only just begun. Lacking an organized body of research or theory, campus planning is likely to be continued on a pragmatic basis. Among the issues still being debated are the role of higher education in a technical society and the extent to which society should support higher education through public auspices. Whatever resolutions are made, there is little likelihood that the demand for campus planning will decrease. Actually there are many indications that the present prognostications for enrollments and physical plant construction requirements are conservative. While population increase is an underlying factor in growth, the requisites of science and technology are equally important factors in enlarging the scope of higher education. In this respect a campus expansion in the United States is part of a world-wide pattern.

FOOTNOTES

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20. Statement of National Association of Manufacturers; Senate Hearings; op. cit., page 615.
21. Statement of the Chamber of Congress of the United States; Senate Hearings; op. cit.; page 609.
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2. Campus Design in Perspective

This chapter summarizes the benchmarks in campus design. The examples are described in chronological sequence, partly because it is convenient to link the design highlights to the growth of higher education in the United States, and partly because this method shows that, from a historical point of view, accommodating more students in an appropriate architectural setting at a time when educational concepts are changing is a recurrent American pattern of opportunity and obligation.

Crises in design are not new to the American campus. Periodic surges in college and university construction have followed all waves of migration and increase in population. This generalization holds true for the Colonial era as well as for the cycle of population maturation that began just after World War II. Population increase and population distribution are but part of the motivating circumstances. More impelling than numbers has been the diversity of higher education concepts which democracy has yielded. As a challenge and a response, cause and effect, the modes of education and their physical forms have reflected the impulses of our society. A full discussion of the interrelationships of society, higher education and architecture is beyond the scope of this book. But a synoptic accounting, however generalized, is useful to illuminate circumstances and conditions from the past which are not dissimilar from those met in today's practice.

There is a serviceable truism that society prescribes what architecture may express. A glance backward substantiates even sub-tenants to this credo. As will be noted, whenever ideological convictions were strongly entrenched in the educational curriculum, architectural continuity was consistently related to the institution's past preferences for architectural style or campus form. Whereever new educational concepts broke away from the main stream they were sure to be clothed in something new. Whenever institutions continued to hold on to the task of being the leading edge of thought, their buildings and campuses were as advanced or as retrogressive as their time.

ANTECEDENTS AND PRECEDENTS

Universities in Western civilization have their origins in the medieval system of guilds of masters and scholars. The North European expression served as the model for the Colonial colleges, in a line that can be traced to Cambridge and Oxford and back to the University of Paris.

Historians of American higher education organize their material into four general time categories: the Colonial college to the Revolutionary War, the expansion of the College, the growth of the University after the Civil War (which roughly parallels industrialism and the introduction of the scientific method), and the broadening of the base of higher education, which is the cycle we are said to be in now. Interspersed in this general pattern are such important movements as the technological institute, the municipal college and the junior college.

The founding of colleges in the United States has been explained as a desire by the colonists for a literate clergy and a body of orthodox lay professionals, plus the determination of the early settlers to preserve the Old World intellectual and cultural traditions. At first they sought to emulate the university models of Cambridge and Oxford, but the vastness of the land, long travel distances and general poverty made it impossible to establish a central university and a munificent architectural setting. In place of a single institution, nine colonial colleges were chartered between 1636 and 1780.

The colleges varied in size and strength, but shared a similar educational curriculum: the liberal arts with a central core of classical languages and literatures. Important changes and modifications made their appearance towards the end of the eighteenth century, including the introduction of mathematics, the natural sciences, and modern languages. Though they were considered by some as offering more of a promise than a performance, the Colonial colleges were important because they were evidence of the fact that the European heritage of higher learning, going back for more than two thousand years,

had not perished in the American wilderness,[1] as some had feared it might.

With the exception of William and Mary College, the Colonial examples are important for their building types rather than as campus plans. The struggle for survival, a moral austerity that shunned ostentation, and a lack of spiritual allegiance to a distant King who had no interest in honoring himself, for a long while kept the colonies impoverished in terms of 17th century public architecture, such as palaces, parks, public works and cathedrals. It is significant, then, that the most imposing early buildings in New England were those built for colleges, Harvard and Yale.

In the beginning, Harvard wanted to duplicate the Cambridge traditions by erecting quarters designed to bring faculty and students together in a common intellectual and moral life. The Old College (1638) and the New College (1674) ambitiously attempted to house the entire student body and masters under one roof. But lack of money prevented elaboration of the concept, especially the connecting quadrangular building groupings so successfully accomplished in England at about the same time. In their place rather plain, individual structures were sited on open land.

Of the early buildings, Harvard's Stoughton Hall (1698) commands attention today, both for size and use of materials, and as a model for several centuries of dormitories. Four chambers were arranged on either side of the separate entrances. Each room had cross ventilation, a fireplace, and a private study. Stoughton Hall had the first donor's room. Bricks from the old Indian training school were used, for which the College provided a free scholarship and a special suite for a deserving native, though none was ever enrolled. All of Harvard's seventeenth century buildings have disappeared, victims of a climate that hastened deterioration, or fire, or in the case of Stoughton, because there was more of the willow than the oak in the construction.

Harvard can claim a number of firsts in addition to buildings, exemplifying the continuity of human nature and campus politics as well as artifacts in campus planning and college architecture. In 1717 the influx of students made it necessary to plan additional space. The Overseers recommended that the "most frugal method of Building would be a double House," 100 feet in length, to cost about 300 pounds. Their request was tabled by the General Court, and when pressed again by the Overseers, an order was finally approved for a building not exceeding fifty feet.[2]

Work was started and the Overseers continued to plead for a larger structure, stating that the 100 foot length be approved: "First, Because it will save considerable charge if the building be carried on entire; Secondly, Because the Building will be much stronger as well as more beautiful; Thirdly, Because the proposed Building of fifty feet long will not be sufficient to accommodate the Students."[3]

The request was finally granted and what is now Massachusetts Hall was completed and opened in 1720. The embroilment with the General Court was only part of a precedent situation; the other, the college president as the master architect. The University archives have two plans for the building, one by Benjamin Wadsworth, which was presented to the government with the request for funds, and the other in the hand of President Leverett, which is considered to be the drawing from which the building was finally constructed.

Forceful presidential leadership was also evident at Yale. With several towns competing for the new colonial college, Gurdon Saltonstall, convinced that New Haven was the proper site, commissioned Henry Caner to erect "quickly" a "great frame building," the most impressive in the Colony.[4] Saltonstall wanted the building completed prior to the visitation of a legislative site selection committee. His impulsive action—for he had little authorization to proceed with such a structure — turned out well, for the building was so far beyond the expectations of the visitors, that they promptly voted in favor of New Haven. Of the several pre-Revolutionary buildings at Yale, however, only Connecticut Hall (1750) remains.

Harvard is fortunate in having most of its 18th century structures still standing, giving physical form to the connections between the earliest days of the College and the latest generation of students. Of all the buildings from this period, Holden (1744) is the most distinctive and beautiful. Its pure Georgian, exquisitely detailed features were extensively copied throughout the Colonies. Reflecting perhaps the enduring qualities of fine architecture (originally Holden Chapel) the building has served as a chemistry demonstration lab, lecture room, and now a choir meeting hall.

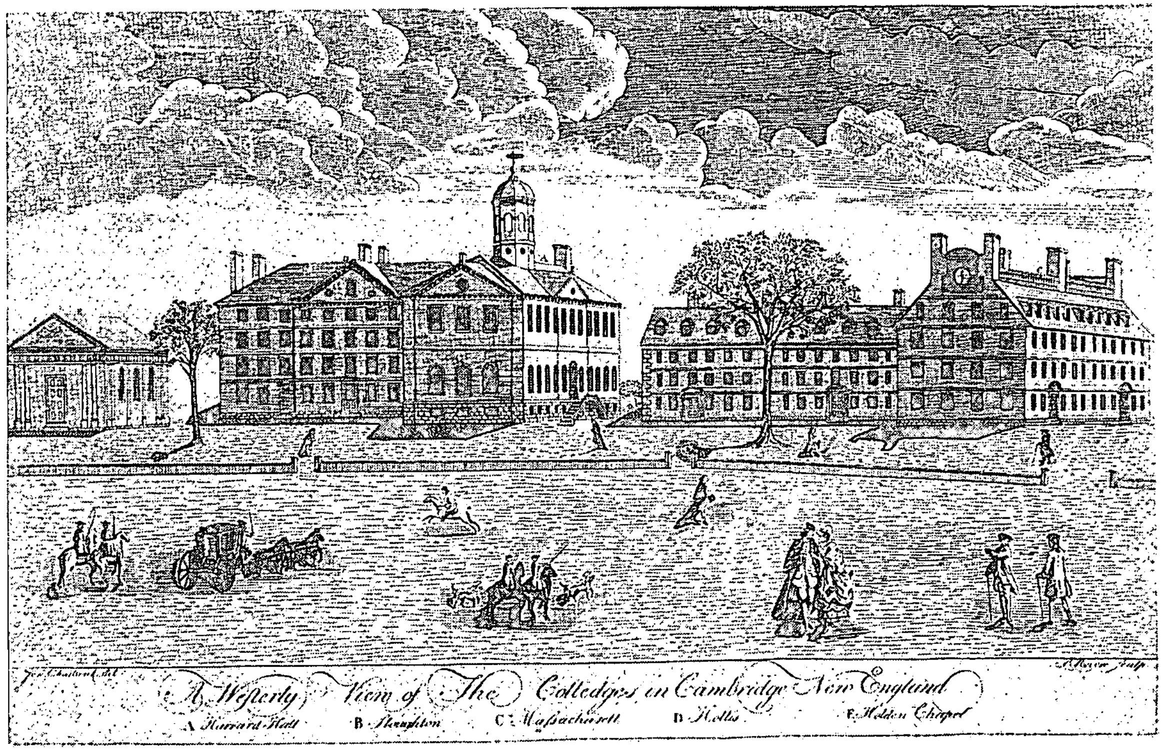
Princeton's contribution to Colonial college architecture is a single, but important building, Nassau Hall (1784). It became the model for a long series of three and four story Georgian buildings. The hipped roof, three entrances, belfrey and pedimented pavilion breaking the long side, was repeated in slightly variant forms in Brown's University Hall and Dartmouth Hall.

This convention was later popularized by those who saw in the building type a true reflection of the early Colonial ideological convictions. While the seaboard colleges were changing in both architecture and education, the simple delights of middle-period Georgian were being carried westward, to be set in place wherever sectarian education was dominant.

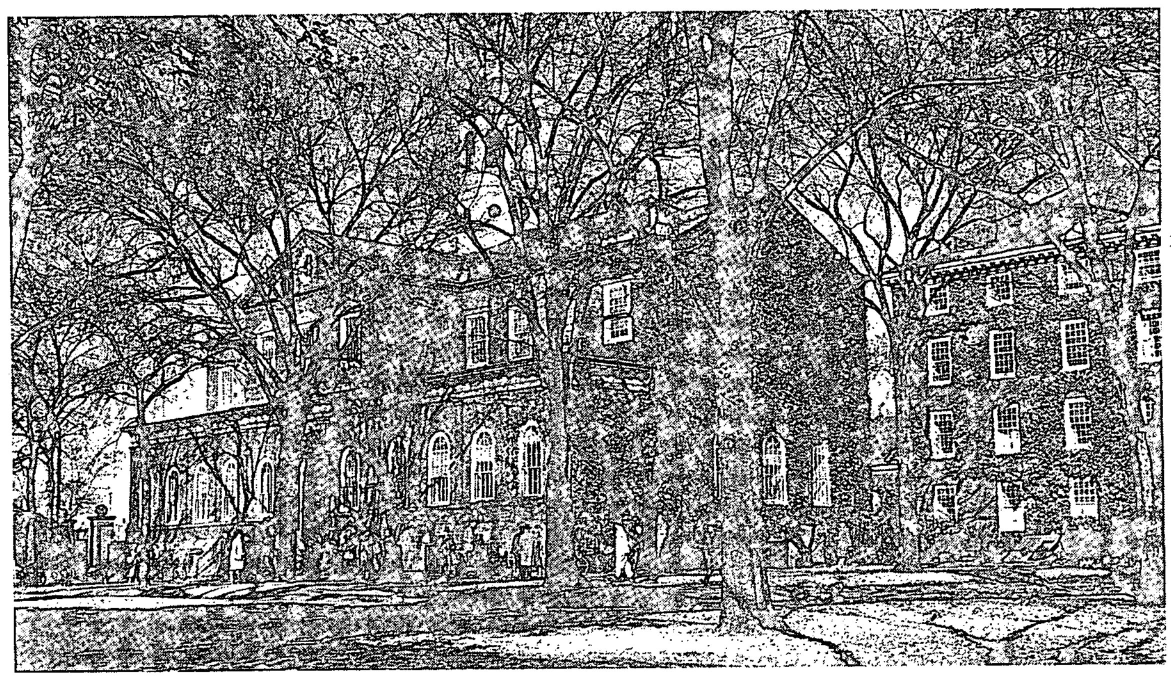
The founders of Alleghany College were not satisfied with transporting just a building type and educational curriculum into the Ohio Valley. In Bentley Hall (1820), a superb example of symbolic faith placed in a particlar style of architecture, the founders imbedded in the cornerstone a chip from Plymouth Rock and mortar from Virgil's tomb.

Prior to the Civil War over five hundred colleges were established in the great proliferation that followed the evangelical groups through the Midwest. Only a hundred or so of these survived, and not all had much in

e way of campus plan or buildings. Small or large, these schools had the major responsibility for training professionals and community leaders. Perhaps learning and achievement became associated with the style of architecture in which it took place, and this could account for the persistence of Georgian in public architecture for public buildings other than colleges.

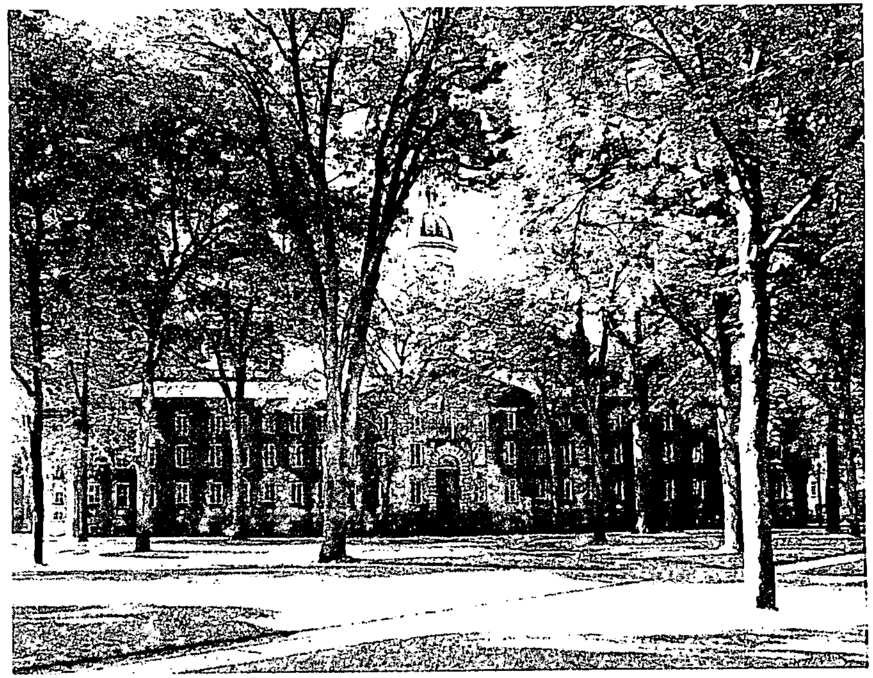


1A



1B

1A
View of Harvard College
As engraved by Paul Revere (1770). All buildings except Stoughton, second from right, are still standing.
1B
Harvard Hall (1766)
Now used for classrooms and lecture halls, it has formerly provided rooms for the assembly hall, chapel, library, dining hall, kitchen and buttery.
PHOTO: HARVARD NEWS SERVICE



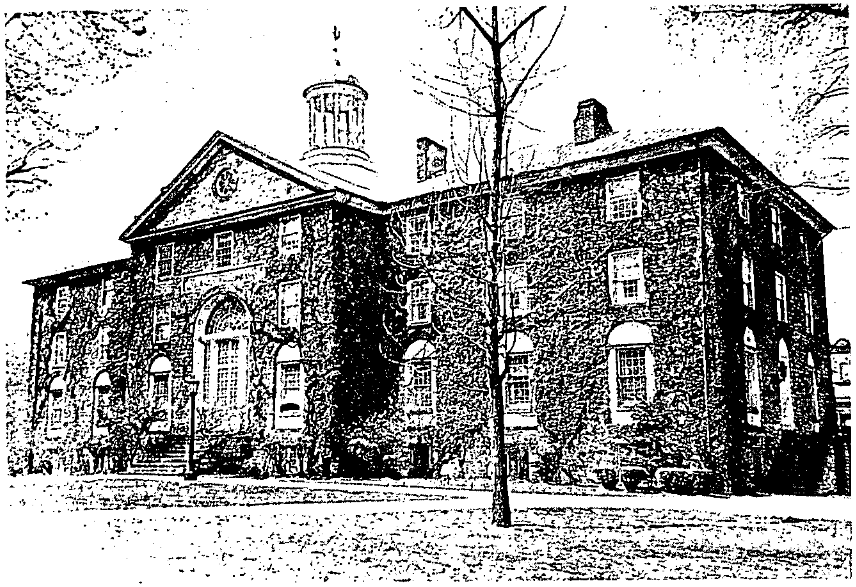
3

2
The College Building, William and Mary College
Williamsburg, Virginia. As restored in 1928.
PHOTO: THOMAS L. WILLIAMS

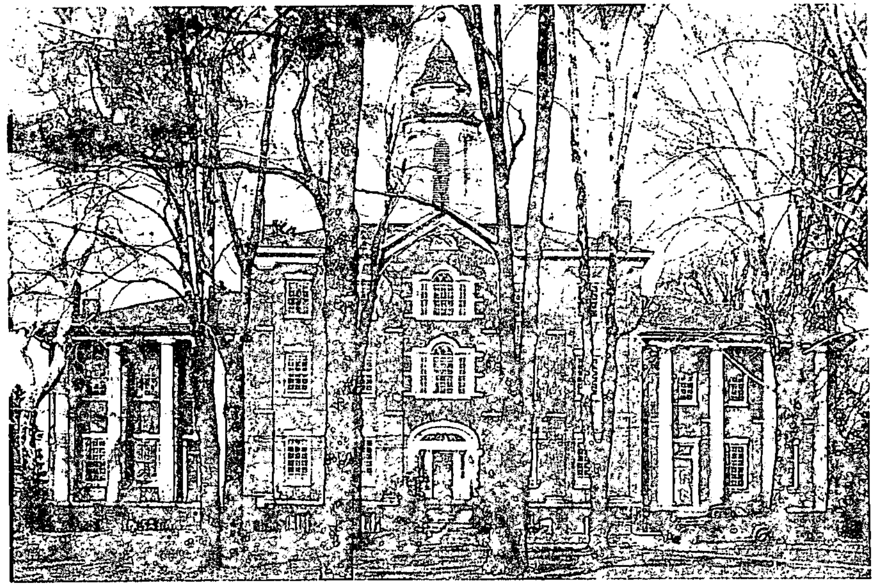
3
Nassau Hall (1756) Princeton University
Designed by Robert Smith (the architect of Independence Hall), the building was twice destroyed by fire. Latrobe's restoration of 1804 retained the three front entrances, one on each side of a central doorway, with corresponding exits in the rear. The restoration of Notman in 1850 added two square towers at the east and west ends of the building. The tops of the towers were removed in 1905 bringing the scale of the building closer to the original design.
PHOTO: PRINCETON UNIVERSITY

4
Old West (1803) Dickinson College
Carlisle, Pennsylvania
"... the most gratifying exertions of my art which I have ever made; and the power to promote institutions on which so much human happiness depends, consoles for the many mortifications which are inseparable from the practice of my profession" (Benjamin H. Latrobe, architect of Old West.)
PHOTO: DICKINSON COLLEGE

5
Bentley Hall (1820) Alleghany College
Meadville, Pennsylvania
Crossing the Alleghanies and moving into the Ohio Valley, the pioneers carried the cultural heritage of the young nation in the form of public buildings, of which Bentley Hall is a superb example.
PHOTO: LIBRARY OF CONGRESS



4



5

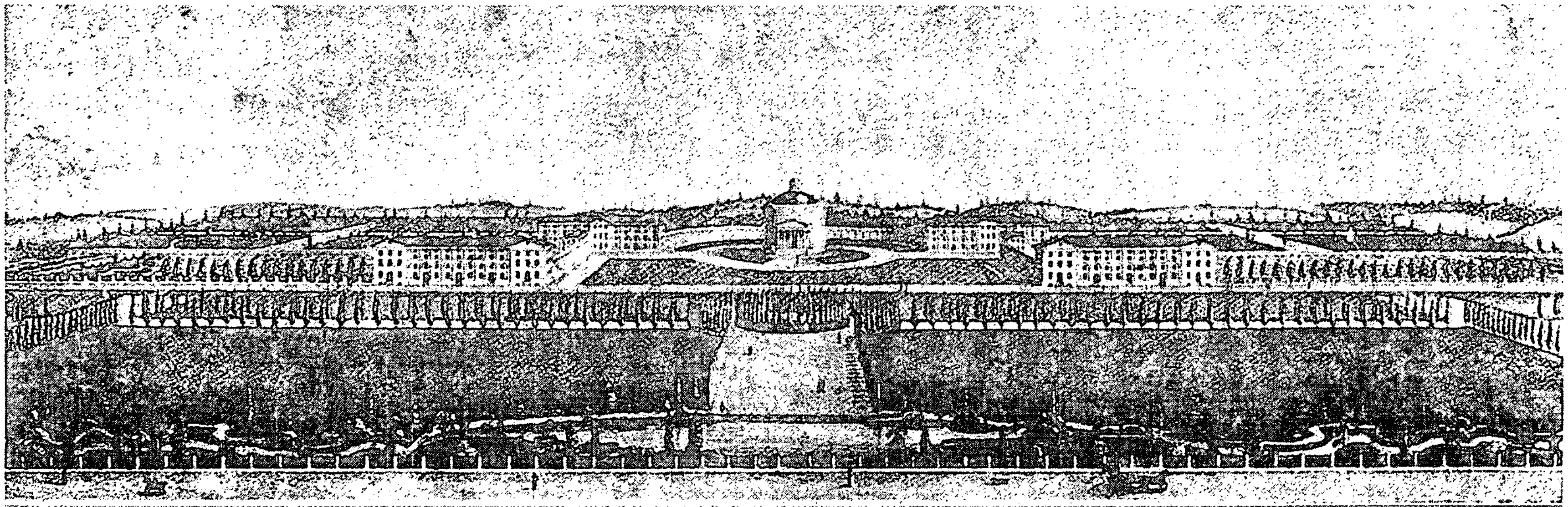
Early planning
The earliest evidence of any premeditated architectural composition—arranging college buildings on the basis of site conditions, an over-all design intention, or program relationship — appears in the drawings for William and Mary College (1699), Williamsburg, Virginia. Williamsburg was the fourth planned town in the English-held lands in North America, following Charleston (1680), Philadelphia (1682), and Annapolis (1694). Theodorick Bland's grand plan established a series of reciprocating axes. The colonial Capitol was placed at the east end of the major axis, and the College at the western end. There is some question as to whether Sir Christopher Wren drew the plans for the College. Professor Eduard Sekler of Harvard University, a Wren expert, believes he did not. Though his contribution was probably not a direct one, Wren's influence as both a planner and architect are clearly seen in the town plan and the first American college building designed by a professional.

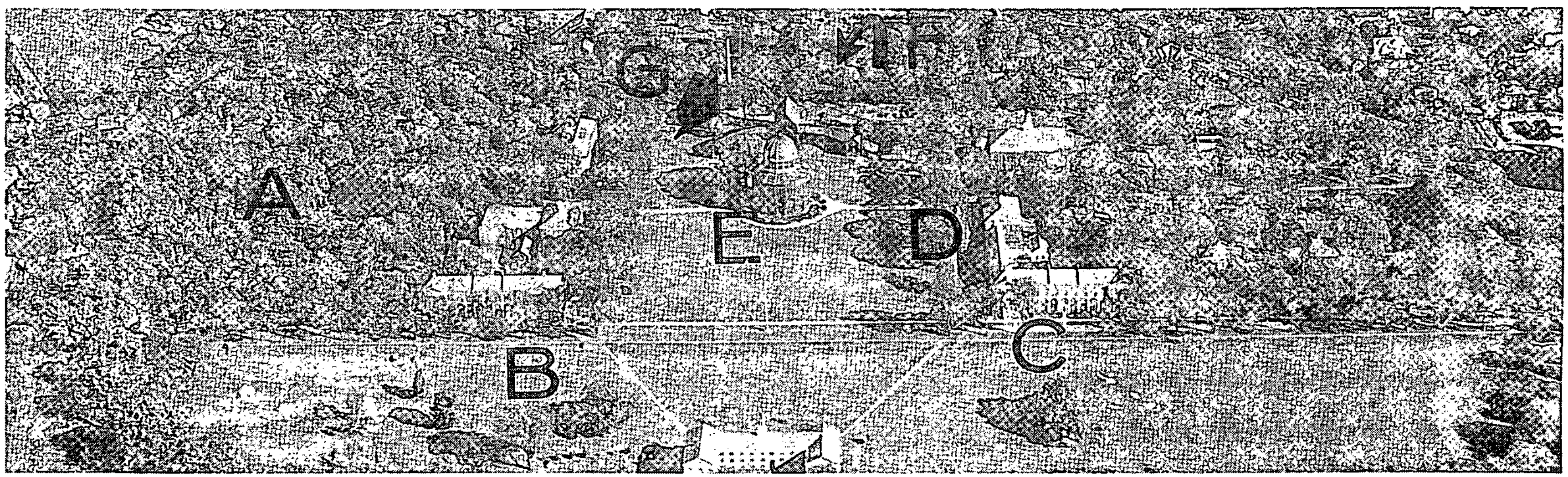
More than a century passed before there was another commissioned search for coherence and order in arranging higher education buildings on the site. This is a tentative judgment, subject to further research, but the honors should go to John Trumbull's plan for Yale. Like many 18th century gentlemen, Trumbull was versed in architecture and landscape design, the standard books and plates being well represented in his library. His reputation as a painter, his skill in composition, and his flair for profitable enterprise led to a request (1792) by Yale for a plan to replace the older college buildings, which had deteriorated during the Revolutionary War.

Trumbull envisaged a long city block of buildings, brick, low in height, and backing to an open green. His landscape interests were directed to camouflage, and we have in his instructions the beginning of the myth (the first record in America, at least) that bad architecture and poor site planning can be planted out. He wrote in the specifications that accompanied the drawings: ". . . The Temple of Cloacina — which is too much the custom in New England to place conspicuously — I would wish to have concealed as much as possible by planting a variety of shrubs . . ."[5]

Though his plan was rejected, Trumbull still managed to leave his impress on the Yale campus. In his late years he designed his "Pinacotheca," which housed his paintings and under which he was buried; it was, in fact, the second museum in the English-speaking world, and the first in America.

6
Mid-19th century rendering of Ramée's plan
6A
Contemporary air-view of Union College
Before construction of Schaffer Library.





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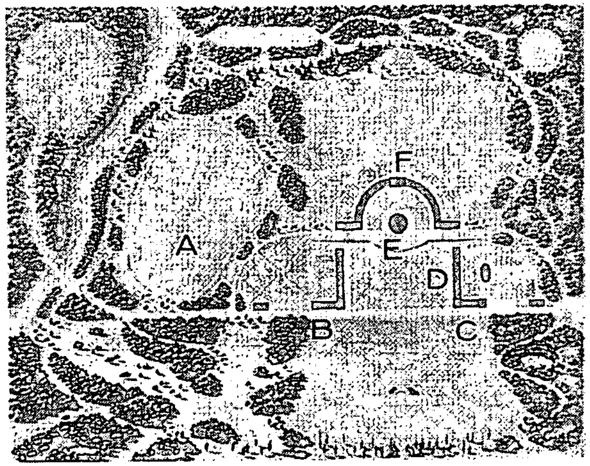
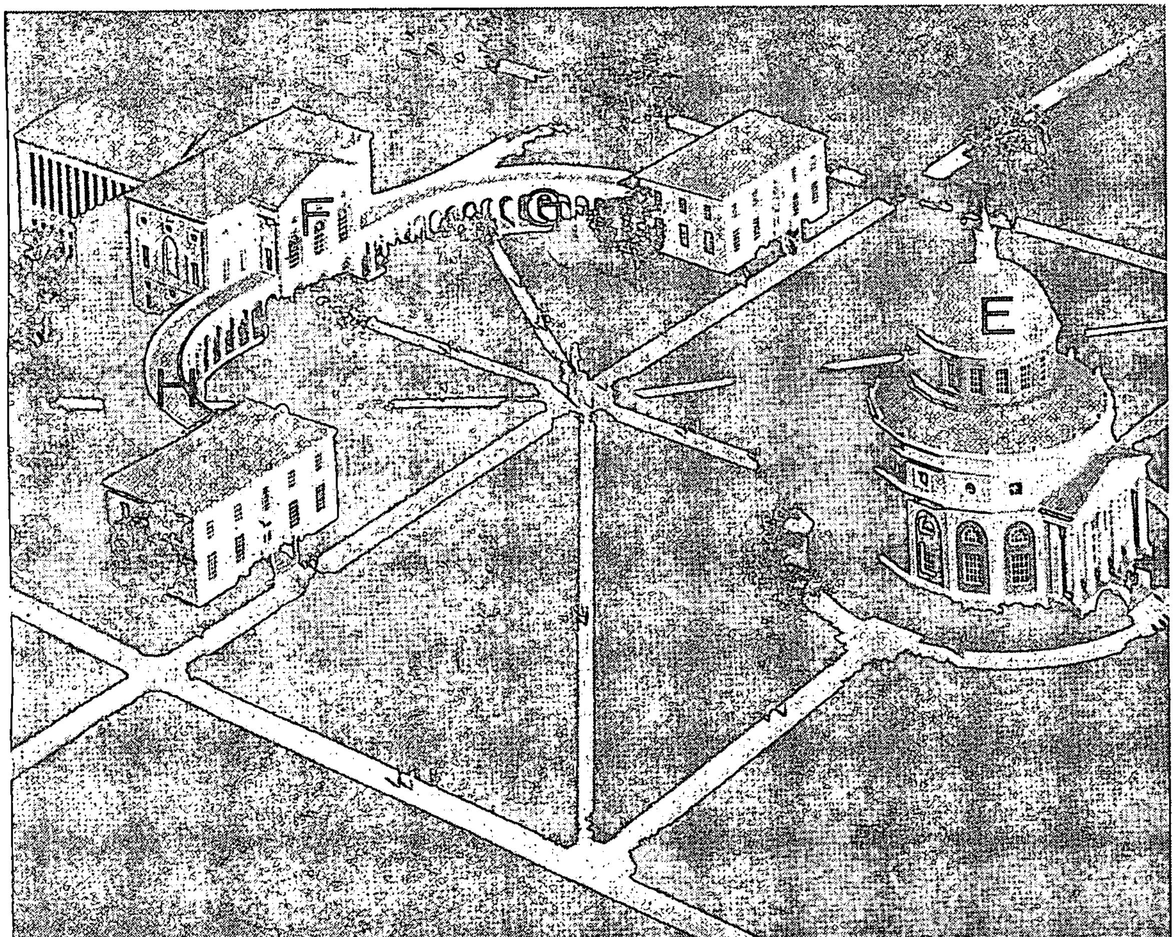




8

7
Sole surviving drawing of Ramée's sketch plan
For the development of the Union College grounds. Elements placed in general accordance with the plan are: (A) Jackson's gardens, (B) South College, (C) North College, and (D) the parallel buildings. Nott Memorial (E) occupies a site close to Ramée's pantheon.

8
Model by McKim, Mead and White (1960)
Showing proposed development of campus in accordance with Ramée plan. Central building, Schaffer Library (F) has been completed (1962), see next page. The scheduled demolition of Washburn Hall and related buildings will allow the construction of the colonnades and attached buildings (G) and (H).
PHOTOS: UNION COLLEGE

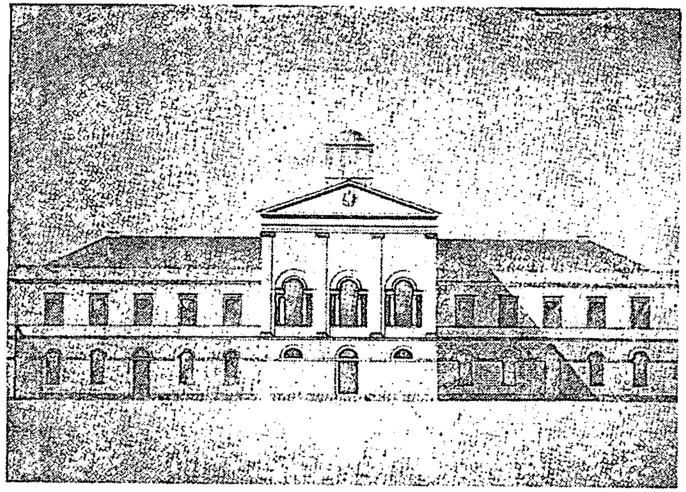
The Union College Plan

The first realized campus plan in the United States was prepared in 1813 by Joseph Jacques Ramée for Union College (Schenectady, N. Y.) The circumstances that brought together Ramée and the President of Union College, Eliphalet Nott, are as unusual as the plan itself.

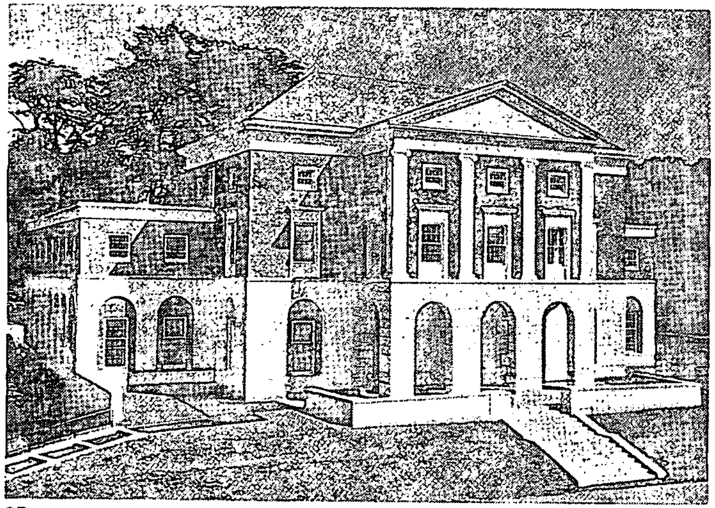
An ingenious inventor, preacher, educator, holding the longest tenure of any college president, 62 years, Nott was a man thoroughly imbued with the concepts of democracy. He ran what has been called a "Botany Bay" for students who were too spirited or otherwise unacceptable to the other colleges of the time. He was also instrumental in introducing a science curriculum to the college, and perhaps the first to put aside the older forms of recitation in favor of a Socratic dialogue between student and teacher.

As a man of affairs Nott entertained widely, and it was only natural that gentlemen of consequence passing through Schenectady would dine at the President's table. In the winter of 1813, one such guest, David Parish, a land owner from the north country and an international financier as well, brought with him a travel companion, Ramée.

Parish met Ramée in Europe where the architect had completed a number of important commissions, first in Paris for Comte d'Artois, and later for the princes and merchants in Hamburg and Denmark. Pushed back and forth by the tides of war, and hav-



9A



9B

9A
Ramée drawing of central building
9B
Schaffer Library (1962)
Designed by McKim, Mead and White. Since Ramée's original building plans could not be adapted to present day programs, does the imitation do Ramée or Nott justice? Both shared progressive views, were deeply concerned with technological advances, were not bound by past traditions. In this respect a contemporary design translation would be in keeping with their philosophy. That Ramée's plan could survive a century and a half of change is evidence of its strength as a design concept; within that concept a 20th century building solution would have been appropriate.
PHOTOS: UNION COLLEGE

ing seen his practice disrupted for the third time, he sailed to America in 1811 to serve as Parish's architect. Ramée had already spent one year prior to his Schenectady visit in upstate New York designing gardens, houses, and other buildings. One source describes his work on a redoubt below the town of Ogdensburg, which was part of the fortifications set up for the American forces in the war of 1812.

Exactly how Ramée got the commission for Union College is unknown. Nott must have been familiar with the work of Latrobe, Mangin and other contemporary American architects who had rationalist qualities that would appeal to his own sensitivity. But he had already engaged a local builder to draw plans prior to the time Ramée arrived. Ground had been broken the year before and considerable investment had been made in site work and foundations.

Nonetheless Ramée was requested to make new drawings and their receipt brought the earlier scheme to quick termination. Nott was highly pleased with Ramée's sketches, so thoroughly done that even the peg-holes could be seen in some of the elevations. The knowledgeable detailing of interiors and the handling of the heating arrangements must have delighted Nott, who himself had invented, among other things, a popular stove—so successful that Nott could leave the school a $600,000 endowment.

Ramée's plan emphatically rejected the monastic self-containment of the Oxford and Cambridge traditions. In a gesture of "extending opportunity for all," the architect established a rectangular court of honor, flanked on both sides by two buildings which housed students and teachers. A U-shaped colonnade connected three other buildings, which surrounded a Pantheon. The influence of Versailles is a defensible attribution, though the plan is unlikely to have been, as some would claim, the model for many American universities.[6]

Like many an architect of his day, Ramée was well trained in landscape design and site planning. His drawings show a sensitive re-

gard for siting structures. An unusual aspect of his plan is that it has continued more or less to guide the central campus growth at Union College for almost 150 years. The two L-shaped wings (see illustration) were constructed during President Nott's tenure, as was a garden suggested by Ramée for an area north of the main grouping. The Pantheon was erected during the latter part of the 19th century, but the easternmost section was just begun in 1961 with the construction of Schaffer Library — designed to simulate Ramée's original scheme.

The legitimacy of this last token obeisance is questionable on several grounds—the library only superficially resembles Ramée's buildings. The site composition does not parallel Ramée's design, as other buildings (erected when there was less reverence for the Ramée's plan than there is now) occupy the original site. Finally, the gray and white stucco exteriors of the new library cannot be ascribed to Ramée, as he designed the buildings for brick, and the stucco on Ramée's work dates from the Civil War, when it was applied to preserve the facades which were then deteriorating badly. For all these intrusions and changes, Ramée's plan still comes through as a strong architectural statement and remains notable as America's first coherent architectural campus plan.

Other commissions did not follow the work at Union College, and after five years of struggle, Ramée returned to Europe, where he died in 1842. His significance in American architecture is relatively unrecognized. His drawings themselves were unknown until rediscovered in a Paris printshop by a Union alumnus late in the nineteenth century.[7] But his contribution to campus design is most important historically. For the first time in America a change in pedagogy was housed in a change in architecture. Ramée attempted to provide an over-all physical pattern to give symbolic as well as practical eidence of the advance. The progressivism of the architect matched that of the client, and as we shall see in Jefferson's work, in such an instance, the architectural concepts become refreshingly new.

Jefferson and the University of Virginia Plan

By any measure, Thomas Jefferson stands as the most extraordinary master planner in American education. He devised the curriculum for the University of Virginia, selected the site, designed the buildings, wrote the specifications, supervised the construction, picked the first teachers, served as Rector, and in his last days rendered duty as the influential member of the Board of Overseers. He led the legislative fight for necessary funds to build and operate the school, and all this for the "child of his old age."[8]

The man's genius and capacity as a political leader is well known, and need not be recapitulated here. His revolutionary educational concept—secular and non-denominational — built on a classic base as much of science and technology as could have been expected in those days. Jefferson placed great faith in public education, especially for the South, which he hoped could be weaned from intellectual dependence on the Northern colleges. Though his great plan inspired others (leading to the founding of Massachusetts Institute of Technology, for example) Jefferson's ambitious project was never completely fulfilled. The inadequacy of secondary education in Virginia, the inability to attract first-rate teachers, and the failure to assemble necessary equipment, specimens, and books, were obstacles to education that eventually could not be overcome. But the physical form which Jefferson gave the University still has today the enduring qualities of a masterwork.

In Jefferson's work at Charlottesville we see the results of the last of the gentlemen architects, and, in an important way, probably the best. Jefferson's perpetual curiosity was roused by mechanical things, as seen in his testing of materials for the buildings: the chemistry of mortar, the seasoning of lumber, and the structural qualities of local stones. Lacking expert help, he trained his own craftsmen so well that some local architectural details attributed to Jefferson were more likely done after his death by one of his mechanics.

The over-all plan for the Charlottesville campus was not based on a "consciously used architectural precedent," but was original with Jefferson.[9] His first scheme in 1817 was a simple square of approximately 800 feet on a side, outside of which separate pavilions were arranged for each professor and his students. The shape of the land acquired under a grant from the legislature forced this plan to be modified to a rectangle approximately two hundred feet wide—length unknown at this time.

Perhaps feeling the lack of character and distinction in the plan, Jefferson solicited comment from several master builders and architects. William Thornton responded with suggestions for detailing the individual buildings, adding a lightness and gracefulness which Jefferson incorporated in his drawings. Benjamin Latrobe addressed his comments to the site plan. He suggested that the major habitable rooms be turned south and that the entire composition be given an appropriate climax by a large and centrally placed building, preferably an auditorium and administration hall. He recommended a change in levels to give further prominence to the structure.

The final scheme incorporated ideas from both men. Two parallels were linked by a rotunda and colonnade (under which students could exercise in inclement weather). The parallels contained classroom pavilions with "dry connections" between buildings. No two pavilions were alike in detail, so as to "serve as specimens for architectural lecturers"—a use to which they still are put. Two rows of residential quarters (ranges) were set in lines behind the parallels, and ingeniously bound to them by a serpentine brick wall, one course thick, which enclosed gardens and "outdoor conveniences." Jefferson was adamant about the siting of his original scheme and didn't follow Latrobe's advice, except for the closing of the parallels with a building.

Latrobe, incidentally, was consistent in his rationalist approach to college architecture. Old West Hall (1803) at Dickinson College has been justly praised for "solid qualities of fundamental planning, good pro-

portions, and excellent materials beautifully used." Latrobe reversed the common arrangement of rooms on either side of dark hallways. He placed halls, stairs and the briefly occupied spaces on the north side, and turned the "inhabited apartments" to the sunny south. At Transylvania he introduced a type of modular space planning for dormitories, using an eight foot square cubicle, which he admired at Princeton. These were arranged in two's and three's to form a suite.[10]

Jefferson's imposition of an aberrated style on his buildings came about from his personal dislike for Georgian architecture such as the Wren building at William and Mary—"rude, misshapen piles which, but that they have roofs, would be taken for brick kilns." The owner of a large architectural library, and having lived abroad, Jefferson was not only familiar with the classical Roman styles, but committed to them *con amore*. He attributed to the styles republicanism, precision and stability, values confirmed in his own mind, but which did not in fact exist in any building that he admired abroad. In designing the buildings Jefferson was unable to translate his emotional attachment to classical forms to the needs of the program, nor control his inventive tinkering. As a result, the placement of windows, stairs and other interior elements were compromised to achieve special effects in the facade.

Present-day critics find Jefferson's campus plan commendable for giving rational form to an educational program, and meritorious in its consideration of site and functional arrangements. There was variety within a singular form, and a good answer to fire and contagious disease which destroyed or plagued so many Colonial colleges.

Time and again Jefferson had to politic for the integrity of his scheme. The Board of Visitors wanted to raise multi-story buildings, to save costs. But Jefferson remained firm, insisting on keeping the scale of the campus appropriate to an "academical village." Later additions by Stanford White and the inevitable minor renovations caused by 125 years of intensive use have changed some of the outward appearance of the buildings. Some roofs originally flat are now peaked, but the general proportions and spatial qualities have endured—in pleasant and sharp contrast to the Neo-Georgian interpretations that now surround the original grounds, and considering Jefferson's distaste for Georgian present an enigmatic context for a high-point in American architecture.

10A
The first program and master plan document
for the development of an American campus and buildings. For clarity in concept, brevity and directness it is unexcelled.

10B, C
The Maverick drawing (1825)
Showing the disposition of buildings in accordance with Jefferson's final scheme. Fire, minor renovations and alterations, plus Stanford White's buildings which terminate the end of the lawns have not compromised the original design, as seen in the contemporary airview to the right.

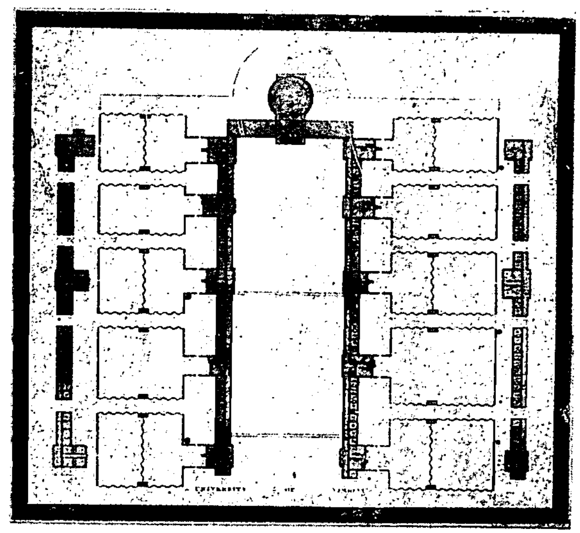
AIR PHOTO: RALPH THOMSON
DRAWING: INFORMATION SERVICE OF VIRGINIA

10A

Report of the Commissioners Appointed to Fix the Site of The University of Virginia, August 1, 1818.

"the governing considerations should be the healthiness of the site, the fertility of the neighboring county, and its centrality to the white population of the whole State. . . . that it should consist of distinct houses or pavilions, arranged at proper distances on each side of a lawn of a proper breadth, and of indefinite extent, in one direction, at least; in each of which should be a lecturing room, with from two to four apartments, for the accommodation of a professor and his family; that these pavilions should be united by a range of dormitories, sufficient each for the accommodation of two students only, this provision being deemed advantageous to morals, to order, and to uninterrupted study; and that a passage of some kind, under cover from the weather, should give a communication along the whole range. . . . The number of these pavilions will depend on the number of professors, and that of the dormitories and hotels on the number of students to be lodged and dieted. The advantages of this plan are: greater security against fire and infection; tranquility and comfort to the professors and their families thus insulated; retirement to the students; and the admission of enlargement to any degree to which the institution may extend in future times. . . ."

From *Thomas Jefferson and the Development of American Public Education* by James B. Conant, University of California Press, Berkeley and Los Angeles, 1962



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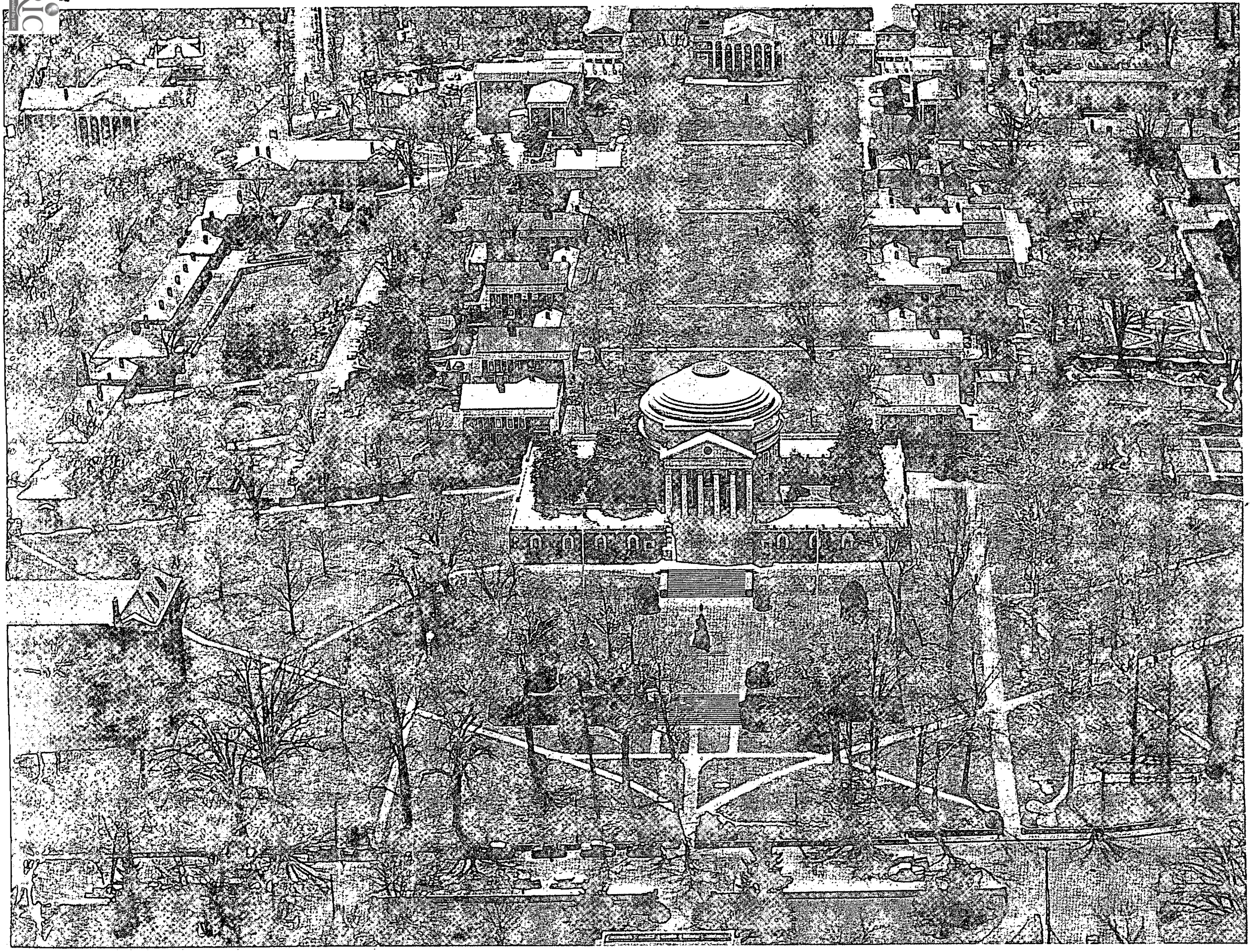


Colleges in the Westward Migration

In the exuberant decades that followed the opening of the Northwest Territories, it has been said that a settler would hardly encamp on the prairie but a college would spring up beside his wagon. To the time of the Civil War, 516 colleges were founded, only 104 of which managed to survive.[11] The proliferation was caused by growing population, sectarian rivalry, and an encouraging faith that no matter how modest the institution, higher education was a symbol of progress. Some claim that it was "the myth of the virtuous small town which determined the location"[12] of these institutions. This is too simple a description, and there are cogent arguments favoring more important causes.

The Dartmouth College case settled a question of government interference in private education by supporting the right of chartered institutions to manage their own affairs. This key Constitutional decision furthered the pluralistic trend in colleges which already had been launched by the inability to construct a centrally located national university. In addition, the separation of Church and State made it impossible for state colleges and universities to give theological training. Each sect thus had its own particular "mission" in conquering the western territories, and each felt the responsibility for educating its ministers and lay leaders. Of forty thousand degrees awarded to the time of the Civil War, ten thousand were in theology. Each denomination tried to have at least one college in each state, and in the populated territories, one in every region.[13]

The rivalry among colleges was fierce. Despite the widespread belief that a college was the ultimate inducement for settlers to stay and develop the land, the evangelic fervor which accompanied the educational missionaries met with occasional antagonism — particularly in Indiana where "public opinion became obstinately prejudiced against colleges, pianos and Yankees."[14]

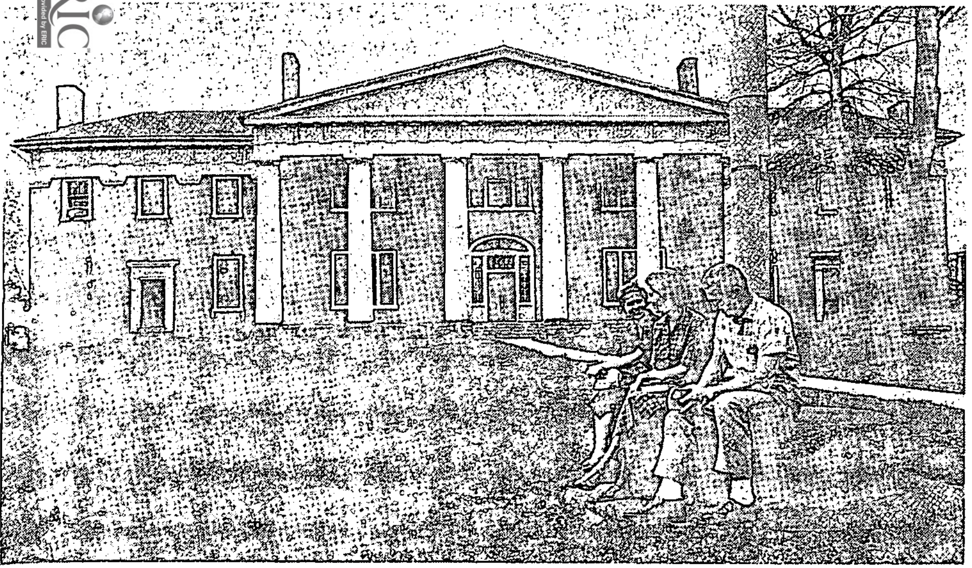
The economic advantages of having a local college were not lost upon the real estate speculators and land developers. A college then was as much a community asset as a flourishing industrial park is today. Intense competition even led to "bidding" among towns for a college to be located within its borders. This was not new, of course, as New Haven had successfully outmaneuvered other Connecticut towns for Yale's favor a century earlier.

The hope of attracting settlers by building a college reached grotesque heights. Many a community would "bankroll" what was for those days a sizable investment in construction, though often the "college" was not much more than a secondary school sheltered in a frame building in a log-cabin settlement.

The first building in Milton, Wisconsin, after the original four families were out of canvas and into huts, was an academy of learning. The building simulated the more substantial types in the East. The "architect" knew what a college should look like, and a Gothic wooden cupola and five spires were set atop the small structure. But even this symbol was not enough, and the owner nailed a large sign (Milton Academy) extending to both sides of the building, leaving no question as to what it represented.

One can map the locations of early colleges and the places coincide with the east-to-west bands of canals and railroads, which either established or reinforced centers of population. The "boosterism" for colleges never abated. Later, in the 19th century, a new college was often a political plum, given to that area which supported the winning ticket, as were other public facilities such as post offices, prisons and insane asylums. One educational institution was awarded as a consolation prize to a community which had been unsuccessful in securing the state penitentiary. Under these conditions it wasn't long before the construction contracts and architectural commissions themselves were easily compromised, and any design vigor that a new campus might stimulate was lost in the morass of local politics.

Early Buildings
11A
Old Centre, Centre College, Danville, Kentucky
Old Centre, was constructed in 1819 by local craftsmen on instructions from the college building committee.
11B
Old Main was designed and built several decades later by an itinerant Virginia carpenter, "who had previous experience of construction in the New England states."
PHOTOS: CENTRE COLLEGE
12
Amherst College (1821-27)
Amherst, Massachusetts
Set on the summit of a hill, Isaac Damon placed two simple dormitories on either side of the chapel. The central building was expressed by a bold portico constructed in the Doric style.
DRAWING: LIBRARY OF CONGRESS
13
Old Morrison (1830-33) Transylvania College
Lexington, Kentucky
Designed by Gideon Shryock, the building was restored in 1962 to its original condition by removing the gable roof and Queen Anne chimneys shown in the above photograph taken prior to the restoration.
PHOTO: LIBRARY OF CONGRESS



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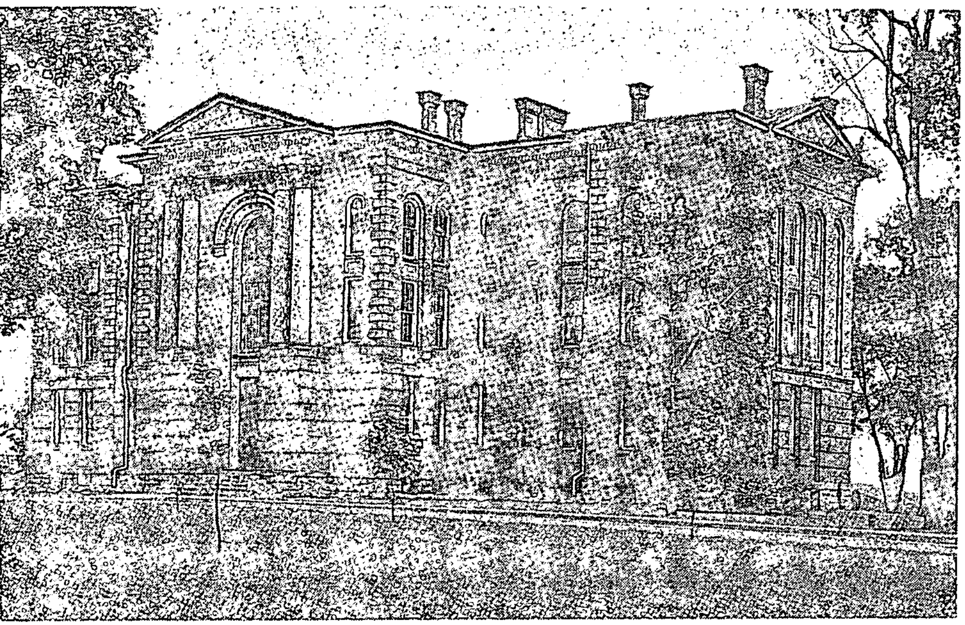

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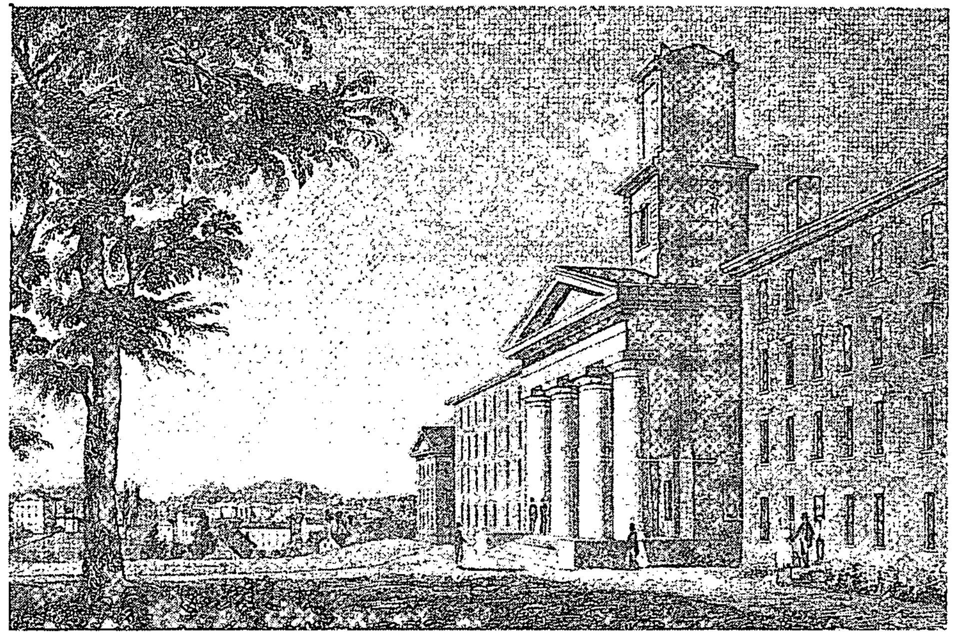
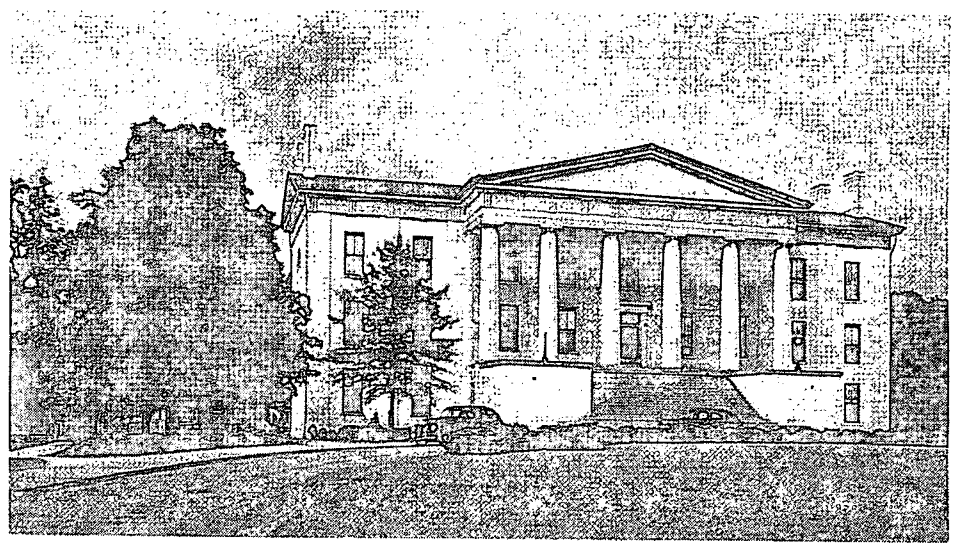
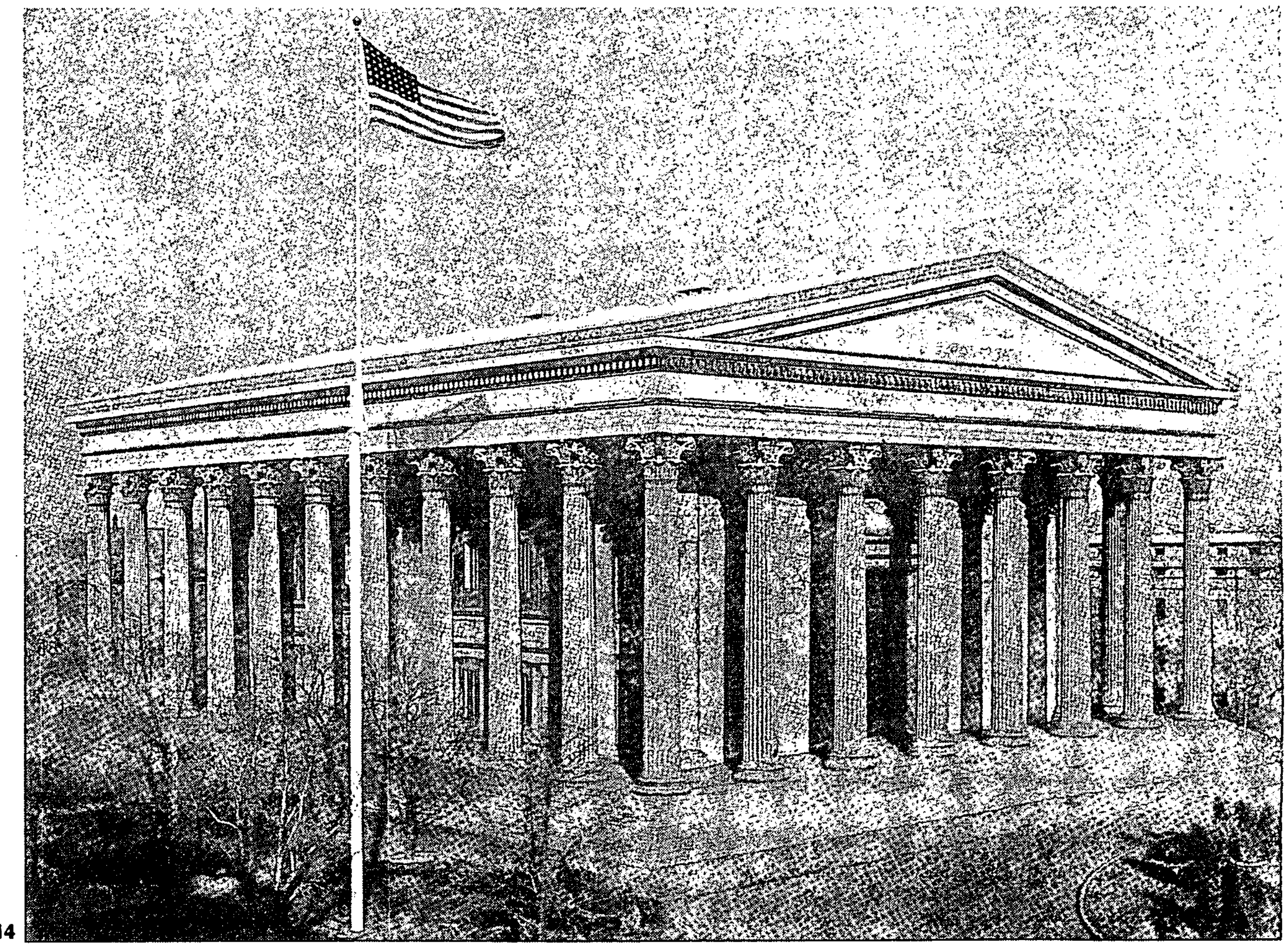


12



13

14
Founder's Hall (1832-48), Girard College
Philadelphia, Pennsylvania
Designed by Thomas U. Walter
PHOTO: GIRARD COLLEGE
15
Charleston College, Charleston, South Carolina
The Greek revival at the height of its style.
PHOTO: LIBRARY OF CONGRESS



14

5

The usefulness of the campus to promote local real estate development was not limited to one period of history or to one region. The Lynds observed in "Middletown in Transition" changing community attitudes towards the local college. In 1890 the school was founded as a sectarian institution; and in 1918 it was turned over to the state to be operated as a normal school when its private supporters could no longer afford to keep it going. By 1925 it was ". . . an inconspicuous institution out on the edge of the cornfields, on the margin of the city's consciousness." In 1936 the slightly elevated lands around the campus were named University Heights by a local real estate combine, and the quiet campus became an important asset to what otherwise would have been a typical subdivision.[15]

Diffusion and democratization of knowledge was the important force in popularizing colleges. Free and compulsory education, chautauquas, lyceums, the cheap press and free library systems all emphasize a high respect for learning. The Midwest had an even greater respect for antiquity, naming their cities, sons, and daughters, commercial and public buildings after the Peloponnesian heroes. All this was eloquently expressed architecturally in the Greek Revival movement.

On the frontier the architecture associated with the Greek Revival had its beginnings in the classical details which were applied first to basically Federalist buildings. Later, master builders such as Porter in Ohio became architects "through books and by observation" and entire buildings were "treated." General affluence permitted relatively high investments in materials and craftsmanshop, and the style flowered in both wood and stone buildings.[16]

Colleges in particular were enamored of this link to the past, as could be observed in the buildings at Western Reserve, Oberlin, Marietta and Ohio Wesleyan, and even at Amherst College in Massachusetts. The vitality which Greek Revival unquestionably had in its best examples was particularly favored in the South. For Davidson College in Charlotte, North Carolina, the architects Towne and Davis placed the largest college plant up to that time in a Greek-like series of connected buildings. And Gideon Shryock's work at Morrison College in Kentucky is considered one of the great triumphs of the style.

However, the late Talbot Hamlin, in his *"Greek Revival Architecture in America,"* gives first honors to Girard College, "a forgotten masterpiece."[17] Certainly the first expensive college building in America (two million dollars) exquisitely detailed with impressive materials, it also illustrates the vagaries of literary taste in architecture and a not unusual problem on campus—the donor and his friends.

Stephen Girard established the building's dimensions in his will, requesting a simple and plain structure. His trustees sponsored a competition for its design and the winner, Thomas U. Walter, provided an appropriate form. But persuaded by the influential Philadelphia banker Nicholas Biddle, who pushed his way onto the Board, Walter visited Europe and returned with a new "appreciation" for the chaste Greek, which Biddle forced on the Trustees. And so a temple was built.

Walter's building has the power of suspending critical judgment against its warped interior floor plan and unfortunate beginnings. Crowning the slope at the head of Corinthian Street (appropriately named by whom?), the generous dimensions of its rooms and the expansive feeling evoked by its scale sharply contrast with the vacuities surrounding it. To visit the brick vaults, to walk through the colonnades, to step back and watch the setting sun model light and shadow is a rewarding experience. Buildings teach, too, and where one successfully penerates time and overcomes early pretentiousness, there is a place on campus and a reason for preserving a historic masterpiece such as this.

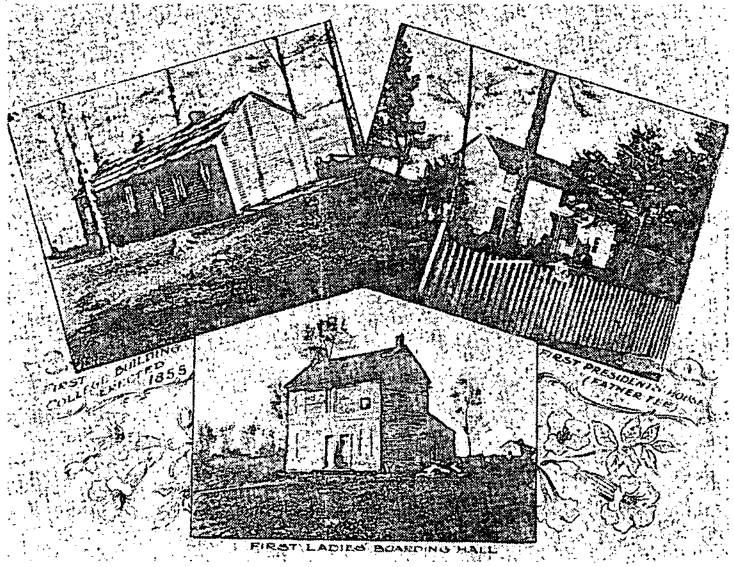
The circumstances at Girard College suggest a Parkinson's law for campus design: a donor's taste, when coincidental with that

of an ambitious college president or board member, can make faster strides in imposing the latest fashion or fad than any aesthetic revolution. Another example: unable to get money in the East, the Episcopalian Bishop, Philander Chase, journeyed to England in the early 1820's to seek aid for his Ohio seminary. He succeeded in enlisting the help of two noble benefactors, and with them visited Cambridge, where all admired the new and old architecture at the colleges there. Returning home in 1827, Chase honored the men by naming the college after one (Lord Kenyon), the town in which it was situated after the other (Lord Gambier), and to the delight of both, proceeded to erect the new buildings in the Gothic style—the first of their kind in America.

The Greek Revival declined, as proponents of Gothic styles drew support by calling for a less pagan form for churches and colleges. The succession in the beginning was helped, no doubt, by a lack of resources for the fine detailing required to render the classic orders. Though it remains to be fully documented, much of the public distaste for Greek Revival and the change to Gothic coincides with the financial panic of 1837 which brought to a halt a number of ambitious college schemes.

The mortality rate among colleges at this time was particularly high. Local support was difficult, if not impossible, to obtain; and many a college president spent long weeks in the East drumming up assistance among the congregations there.

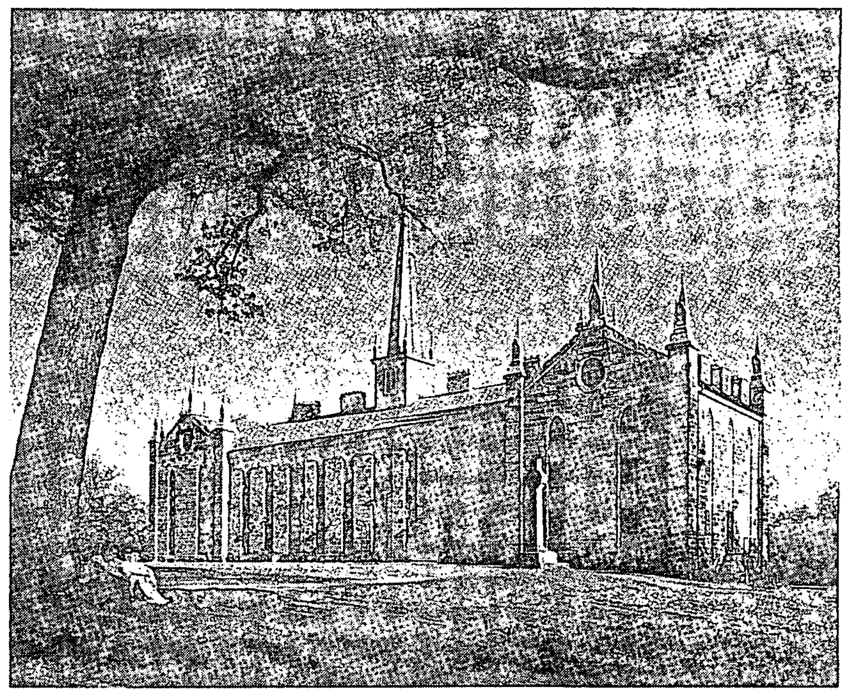
Economy in construction was then, as now, an important matter. Pressing for funds, the President of what was later to become Butler University could defend his selection of a large Gothic structure because it was so "designed that any one of the three sections could (when built) present a complete appearance."[18] Later, Upjohn's "Rural Architecture" made it as easy to embellish a Gothic detail in wood as it had been to do a Grecian cornice.



16

16
Berea College (circa 1855), Berea, Kentucky
There are few wooden buildings left from the pre-Civil War colleges' years. These rare photos of a Kentucky school, built two centuries after Harvard and several decades after the University of Virginia, illustrate the penury, poverty, and dedication of the pioneers.
PHOTO: LIBRARY OF CONGRESS

17
Old Kenyon (circa 1828)
Kenyon College, Gambier, Ohio
PHOTO: HEDRICH-BLESSING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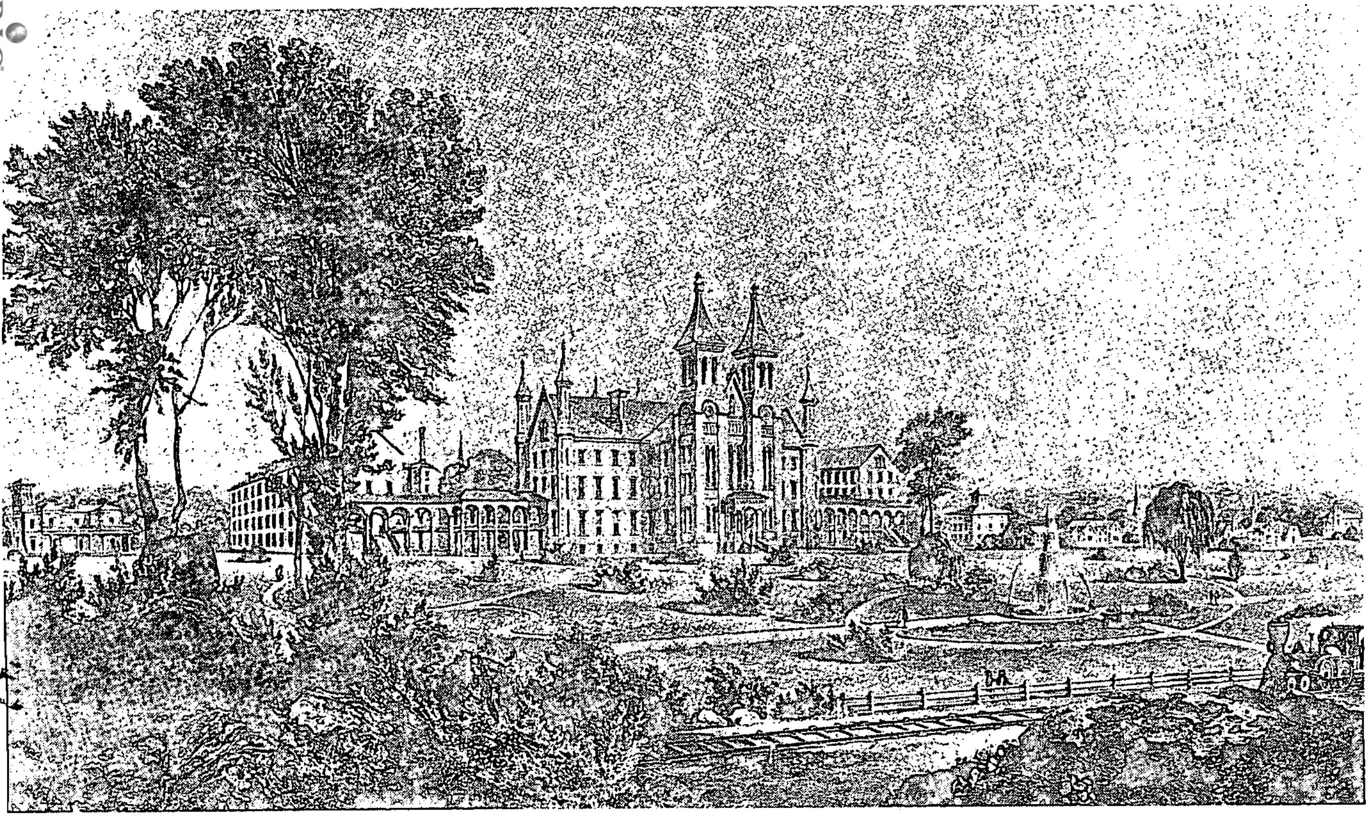
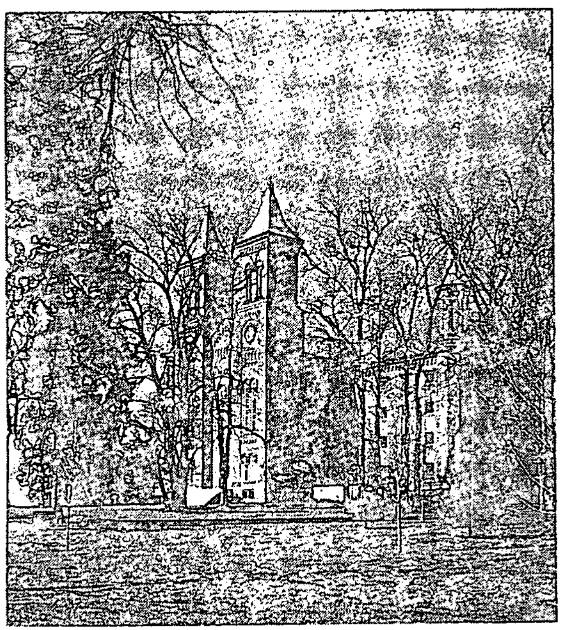


18A



18B

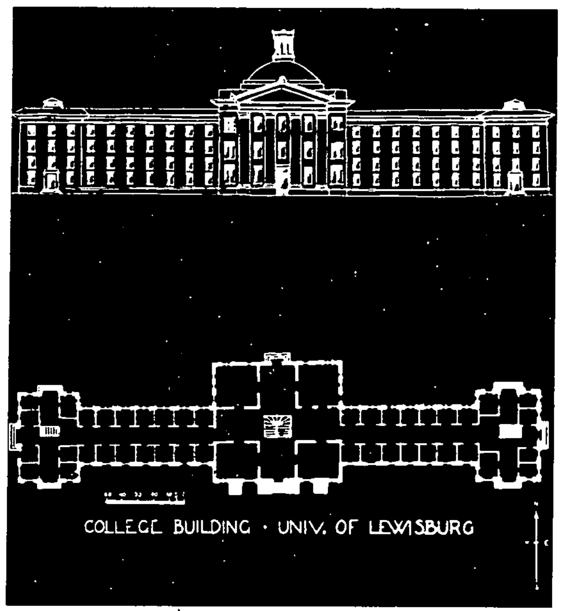
18A
Antioch College, Yellow Springs, Ohio
Designed by the master builder A. M. Merrifield, the original plan called for a central hall, flanked on either side by two dormitories, connected by arcades, reminiscent of Ramée and Jefferson. Antioch Hall, the central building, modelled after Worcester Academy (Massachusetts) was typical of the exuberance of the Gothic Revival. Lack of funds prevented the scheme from being fully implemented. Because of their size the buildings were considered "daring if not impractical" for their period. Restorations made to Antioch Hall in 1953 revealed the inadequacy of the rubble footings and some of the wood structural members. "It was clear that the local builders had little experience in the mechanics of such construction."
18B
Antioch Hall, 1962
PHOTOS AND QUOTATIONS:
MORTON A. RAUH, ANTIOCH COLLEGE

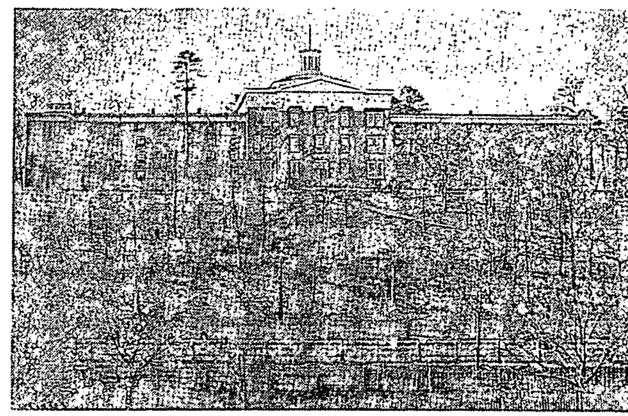
On campus as well as outside the groves of the academy, prevailing tastes are influenced by the political and social climate that motivates decision makers. In Michigan (1838) those peripatetic architects, Towne and Davis, persuaded the Regents (who wanted both a model university and outstanding buildings) to accept their Gothic plans for the Ann Arbor buildings. But political forces, which sectarian interests continually used to avoid the formation of a competitive public institution in the state, found surprising support in equally combative voices of local mechanics, who decried what they saw as "the fooleries and splendid extravagances of Europe." The combination was too much. The strong university concept was (temporarily) put away, and instead of a larger plan, four modest semi-Greek Revival houses were erected, for teachers and equipment.

Throughout the pre-Civil War period, changes in taste seemed to make little difference to some college architects. Towne and Davis were facile in Greek Revival, and while they had no luck with Gothic at Michigan, they went on to do significant commissions in that style at New York University and Yale. Their adeptness is apparent in their invention of Medieval Military for the Virginia Military Institute. The long axial composition was complete with solid walls and crenelated parapets, which set the tone for a long list of armories and state militia sheds that followed. The firm successfully straddled not only the question of style, but also of politics, as they were invited back after the Civil War to rebuild schools which had been destroyed by battle.

Despite an avowed obeisance to Cambridge and to the Greek, no significant overall plans were produced in this period. Most colleges had small enrollments. Sometimes the entire staff consisted of a clergyman and his wife. Often the physical plant would be contained in one or two buildings. Nor was there much in the way of non-building elements. Playfields were unknown in the pre-Civil War college; intercollegiate athletics didn't appear until the last half of the century. It wasn't until Harvard led the way in 1840 that gymnasiums were built. With so little money for buildings, landscape embellishments were considered extravagances, though the picturesque rural qualities of many colleges required little improvement. In urban areas a picket fence, or a low stone wall and gates would separate college from town.

The design problem for colleges was mostly the selection of a proper symbolic cloak for a building — a tailored personality. Nor were other educational institutions free from an infatuation with the past. West Point and Rensselaer Polytechnic Institute, which was its civilian counterpart, trained most of the country's engineers. In retrospect, neither found an architecture appropriate to its undertaking. Municipal colleges, medical schools and the early agricultural and mechanical colleges — none of which had any sectarian commitment—gave no hint in their architecture of the vitality and energy with which they were imbued. The apparent inability to put form on a function didn't end with the Civil War and the coming of the great universities.





19

The Academy Building (1848), Bucknell University, Lewisburg, Pennsylvania. **Designed by Thomas U.** Walter and said to be the largest college building constructed prior to the Civil War. Conjectural restoration by George L. Hersey.
PHOTO: BUCKNELL UNIVERSITY

The University Tradition

In the years after 1865 the college lost ground to the university. This new institution was soon "to reflect the element of bigness in the academic world."[19] The Morrill Acts gave important impetus to the public universities. The growing industrial wealth made possible sizable expansion at Harvard, Yale, Princeton, Columbia and Pennsylvania. Philanthropists provided generous endowments for Johns Hopkins and Cornell, while the University of Chicago and Vanderbilt were built whole, new and entire.

Senator Leland Stanford was advised, as he conferred with President Eliot at Harvard, that it would cost five million dollars to start a new university. "Well, Jane, we could manage that, couldn't we?" he is said to have replied to his wife. His family's contribution eventually would amount to twenty-one million. This was a generous benefice, since the opinion back East in 1891 considered this "a frightful waste of money" because the "irreclaimable desert" between California and the populated regions of the United States would keep Stanford from being more than a local academy.

Universities were animated by a dual vision: first, the "disinterested pursuit of truth through original investigation,"[20] which was carried over from the German University tradition; and secondly, the concept of the University as a center of learning offering many diverse subjects. The characteristics of the former were expressed in graduate study, research and advanced degrees — which were almost mandatory undertakings as industrialism and the scientific revolution impelled technological innovation. In the latter the progessive ideas at Cornell, Wisconsin, Minnesota and Michigan produced the egalitarian, all-purpose curriculum. The liberal arts as traditions would combine with the applied sciences and research, dedicating both to the "service of the needs of society through the systematic study of commerce, government and human relations."[21]

Total enrollments in higher education in the United States tripled in thirty years—from 70,000 students in 1870 to 238,000 in 1900. While new private schools accounted for some of this surge (as well as the expansion of the older institutions), it was the public support of state universities which helped push the total enrollments upward. At the turn of the century four of the eight largest universities were public institutions with enrollments close to 2,500 students — Michigan, Wisconsin, Minnesota and California.

The society which produced such educational diversity was unable to do much to give the new universities and reconstituted colleges an appropriate architecture. All the conditions for significant campus design were available: open-minded clients, new materials for construction, and strong motivation for order and coherence. But it was a period of contradictions and circumstances. There were few people able to organize an unambiguous response to the bundle of opportunities presented.

The balance of blame can be shifted to the architectural profession, which was blinded by affluence and conditioned by a foreign training that was itself impervious to its own condition. On the other hand there is little to suggest that popular taste was any better, as indicated in the design of industrial products, from Pullman cars to bathtubs. It was this vulgar demeanor, perhaps, that induced leading architects to impress an aristocratic mold on campus facilities as a kind of countervailing power.

With a few exceptions such as Henry H. Richardson, "historicism" dominated campus design until the years following World War II. The architectural critic Henry Russell-Hitchcock uses the word "historicism" to include "eclecticism," "traditionalism," or "revivalism"—architecture which re-uses forms of past architectural styles. As Hitchcock notes in his summary of 19th and 20th century architecture, "the technical competence of American architects in this period was very great, the sums of money available almost unlimited, and the avowed standards of design only the vague ones of 'taste' and 'correctness.' "[22]

When beliefs were strong and money was sufficient, the buildings on campuses were impeccably rendered in Georgian or American Gothic. Occasionally there were ground swells toward regional expressions, such as Charles Z. Klauder's Italianate for the University of Colorado, and the events that led the University of New Mexico to embrace Spanish Pueblo as its official style (see page 225). But the opportunities for a new architecture were smothered as long as sectarianism prevailed, or the leading schools held to traditional forms. The truth of the matter may be that there were few people prepared or licensed to do anything else but "historicism." Certainly none of the architectural schools had the competence to educate a new breed until the late 1930's.

THE IMPRINT OF THE PREVAILING TASTE

Toward the end of the 19th century, journeys to Italy and France inspired the designs for most public buildings, but England became the stronghold of campus architecture. A contemporary description has John Stewardson "revolutionizing" college architecture after a visit to St. John's College in Cambridge. With Walter Cope he had already started drawings for the University of Pennsylvania dormitories, but stopped them and started over (1895). He is said to have brought back the house plan idea, a series of separate units opening onto an enclosed quadrangle, agreeably suited for obtaining a semi-cloistered environment in an urban surrounding.

Moot point or not, the English influence cannot be dated from the Pennsylvania dormitories. There are stylistic antecedents at Kenyon, and William Burges's plan for Trinity College and Henry Cobb's work at the University of Chicago are earlier examples of atmosphere designed in the Oxbridge manner.

Mood travels well. The "subtle influence of solemn architecture" was epitomized by Ralph Cram's graduate college at Princeton—in his own words "half college and half monastery."[23] In a romantic way it beautifully reflected the client's wishes, as Princeton was opposing the German university influence by establishing a residential plan in the English tradition. Later, at Harvard, Lowell would combat "bigness" by turning to England for his House Plan along the Charles. But this time Georgian prevailed, *semper* Harvard.

In evaluating the American Architecture in the mid-1920's Talbot F. Hamlin would write in his "The American Spirit in Architecture," "Education has become a national religion, and buildings like the Princeton dormitories and the Yale quadrangles are the cathedrals of this modern faith." James G. Rogers' Harkness Quadrangle was well within the mainstream. Monasticism was further evidenced in James B. Duke's selection of architecture for the men's campus at Duke University. Impressed by Cram's work and caught up with religious fervor, he called: "... I want the central building to be a Church, a great towering Church which will dominate ..."—an aspiration which may already have reached a zenith in Day and Klauder's forty-one story Gothic cathedral of learning at the University of Pittsburgh.

A historic past can be rightfully claimed by Oxford and Cambridge, but no kind judgment can be made of the exaggerations claimed for Duke University. The women's campus to the east was said to have "serenity, repose and stateliness," and "emulated" Jefferson's plan for the University of Virginia, though in fact Jefferson's design was his expression of masculine determination. To the west, the "restlessness and irregularity" of collegiate Gothic was to "hover" over the men's campus. A contemporary observer could baldly write (1936): "the severe style of a medieval fortified castle, precisely right for West Point on the Hudson, was thought too feudal for a university set in a North Carolina forest. A modern university housed in castles would have been in truth an effectation, and it is one of the delights of the Duke Gothic that affectations have been avoided."[24]

Affectations were universal. For C.C.N.Y. (1907), George Browne Post offered the trustees their choice of English Collegiate Gothic or Classical Renaissance, both similar, he suggested, as regards cross section and interior layout. Post missed an unusual chance for a significant building. The expensive excavations into Manhattan bedrock forced him to use the local materials in the building walls, and he took great care in arranging the surface effects of the rusty, iron-flaked, earth-colored stones, much to the disgust of the Italian stone masons working on the job.

Post gave the college "complete architecture," including interior design for rooms and furniture, much as Skidmore, Owings and Merrill would do a half century later. But the reading desks, clocks, lecture seats and light fixtures (forty different models) were as eclectic as the unfortunate terra cotta decorations that the architect finally imposed on his plain and simple masses.

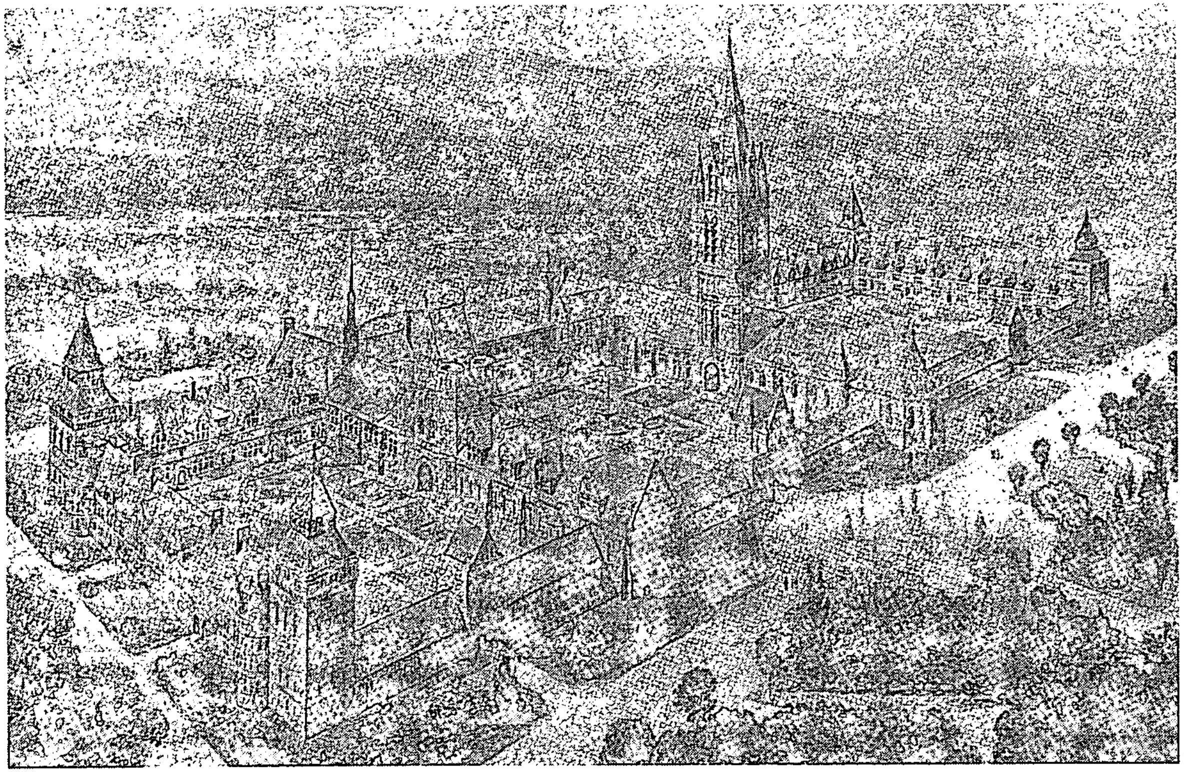
Twenty years later a president of the same college proudly pointed out how the efficient skyscraper has come to symbolize the posture of business and efficiency in the newest school building. But the past was still clinging to what he called a "modern interpretation of the Italian Romanesque."[25] And in Flatbush a new branch (Brooklyn College) was dressed in Georgian, the library being forced into a miniature Independence Hall. Only a sensitive site plan and delightful landscape design, which afforded some semblance of greenery and something flowering all year round, softened the incongruous, bulky buildings.

Georgian or Gothic, a critic wrote in 1936, "the choice of either style is characteristic of the conservative nature of our institutions and is indicative of America's coming of age sufficiently to remember the past."[26] Six years later the atom was split under the grandstands in the Gothic stronghold of the University of Chicago, and for some the past was with us no more.

20
The William Burges Plan, circa 1878, Trinity College
Hartford, Connecticut
The original site of the college was sold to the State of Connecticut for the State Capitol buildings. The college moved to the southwestern part of the city, where the master plan of Burges has guided the placement of many of the buildings, as well as establishing an architectural tradition that has been continued for almost a century. The enclosure suggested by the Burges Plan has never been completed, however.
DRAWING: TRINITY COLLEGE

21
Original site plan drawing, University of Chicago
Designed by Henry Ives Cobb (1893), the plan reflects the character of the Cambridge (England) colleges, with their enclosed spaces, formed by sculptured walls and connected by towers and gateways. Though the enclosure to the west was never completed, the spirit of the design was carried out and the composition is the finest collection of buildings and total site composition of its period in the United States.
PHOTO: UNIVERSITY OF CHICAGO ARCHIVES

22
The American University, Washington, D. C.
Henry Ives Cobb's plan of circa 1899. The English Gothic style has given way to the classical orders of architecture and a space composition following the fashions of the Columbia Exposition—from buildings forming spaces to buildings sitting in space.
DRAWING: LIBRARY OF CONGRESS



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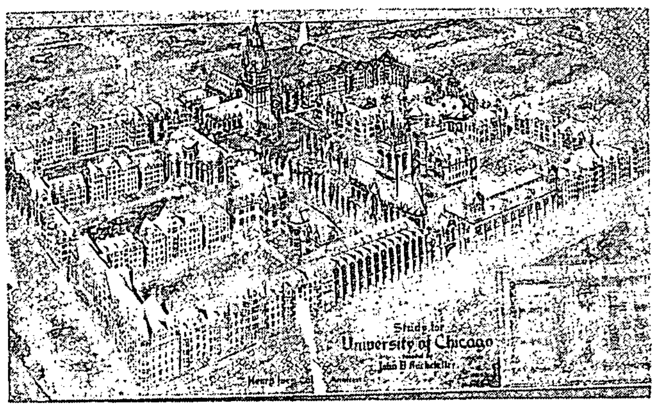
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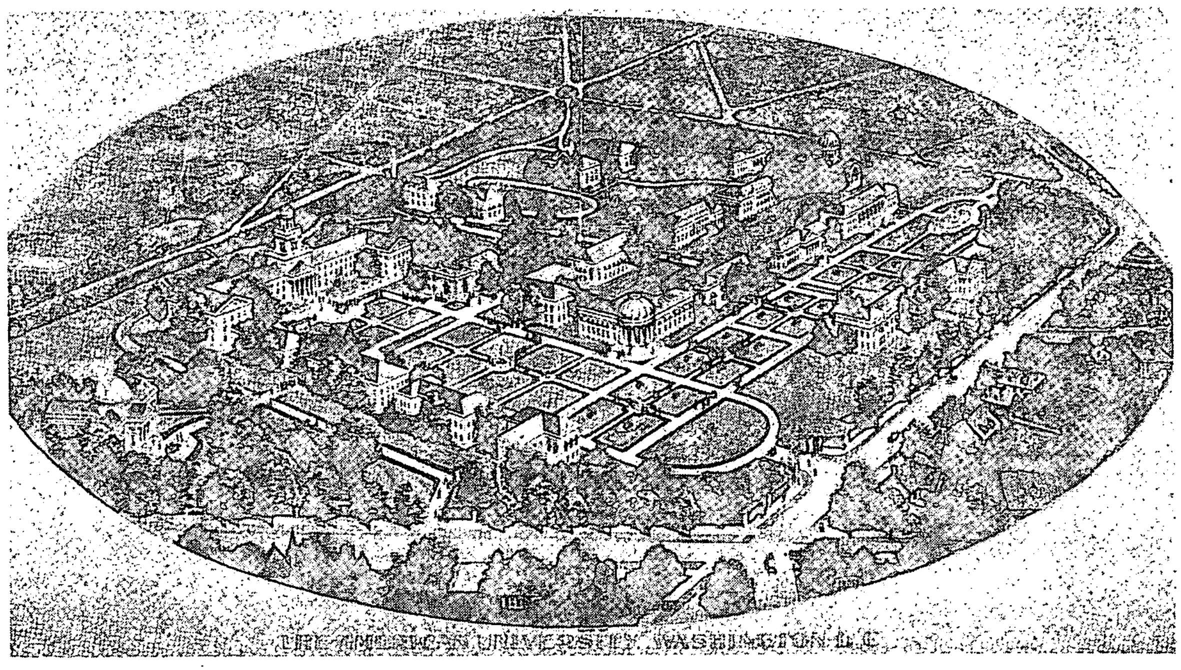

THE AMERICAN UNIVERSITY WASHINGTON D.C.

22

Toward Planning

If, symbolically, style was the embodiment of the past, then the plan was an honest search for a future. Looking back at forty years of growth, the President of the University of California could write in 1931: ". . . one of the few if not the only concept that has been added to architectural practice in modern times is that of the contrivance of a convenient plan . . ."[27]

Plan here does not mean the physical continuity in contiguous structures which we see in the Trinity College plan or at Duke, or the Harkness Quadrangle at Yale; it is rather the dominance of site and program over facade. True, the plan concept brought imperialistic styles to the campus, but the reasons which engendered *plan* eventually brought about the downfall of such styles. While plan may not have given birth to the architecture that was to follow eclecticism, it at least held the campus together during transition. And if in our own time taste and style continue in cycles, as they will and must, it is plan that offers hope for continuity within change, and a viable campus design.

This is a judgment and observation to be supported later. It is mentioned here because the campus changed in a quarter of a century from one or two buildings, housing all the facilities, to many buildings, diverse in form, shape and function. In the beginning of the great surge (1870) architects tried to continue using the common mold of a historic style; but as more and more buildings were needed, the contents began to be separated from the traditional containers.

In the waning decades of the 19th century, new curricula and a new collegiate way of life gave rise to new building types: sheds, laboratories, libraries, dining halls, gymnasiums — all appended to the traditional classrooms, commons, dormitories and chapels. To these can be added such physical plant elements as central heating plants; fraternity houses, agricultural experiment fields, and playfields. On the latter, folk heroes, such as Frank Merriwell, bridged the gap between the campus and the people, and if to Cram the college was a monastery, the popular literature of the period described it otherwise.

The University of Illinois, which had erected one building every three years before 1900, would average two a year by 1910, and three a year in the decade that followed. The volume was the same everywhere, though the pace of construction was a little slower here and there.

For a while it was a period of architectural sensations, each style and mood having its day, only to give way to another exuberance. The buildings would be placed haphazardly, where they were most convenient or would best be seen "setting forth in dramatic form the sequences of temper and incident" which shaped the life they decorated. Harvard was offered a million dollars for a dormitory if the school would build it in the Turkish style. "Why Turkish?" the donor was asked. "Because it is the only style not yet represented in the Yard," he replied. As Joseph Hudnut would write later, it was "the only important bangle lacking in our bracelet of souvenirs."[28]

Little wonder that the Columbia Exposition of 1893 would captivate those architects who found in its singular architectural order and grand plan an idea which offered great promise. Just as the exposition gave incentive to the City Beautiful movement, with its imposition of boulevards and monumental axes on differentiated architecture, so too did new designers of new colleges and old find in its principles of arranging spaces and buildings a method for giving some control to campus growth.

Pretentious as it was, and shallow as it may have been in its comprehension of the city as seen in Burnham's plan for Chicago, the Exposition did mark an important beginning for planning. A decade before, a master architect such as Richardson would not "propose the larger truth that a great city must be more than a collection of fine individual buildings."[29] Two decades later, and since then, no architect of stature would fail to mention the compositional relationship his commission had to the total city fabric. It was no different on campus. Even when the classical plans and buildings gave way to contemporary expressions it would be a rare instance in which a new architect on campus would fail to show his concept of how the college should grow and how the college's future buildings should be arranged while displaying the renderings and models of his proposed building.

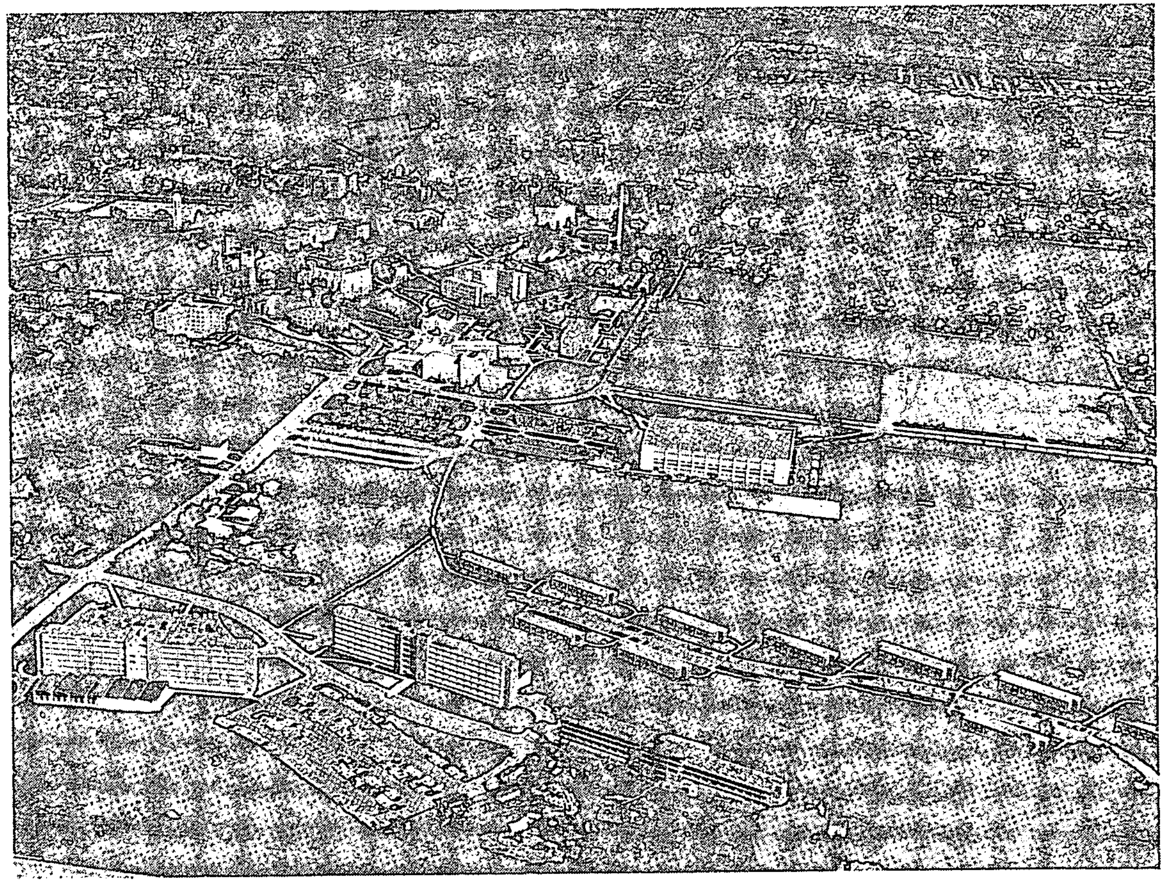
The ground rules for comprehensive campus planning were already being set by architects and landscape architects prior to the Chicago Fair. Precedents are evident in the compositions of William Burges for Trinity College and Henry Ives Cobb (University of Chicago). Comparing Cobb's plan for the American University (1898) and University of Chicago (1893) we can note one great change brought about by the Exposition. In the former buildings enclose space, in the latter buildings are located in space. Historically the work of the Olmsteds is equally important, as they had identified the importance of site conditions, including topography, climate, the "natural views" and vegetation. Based on their site analyses, major roads and entrances could be located. A primitive zoning principle could be applied, placing like functions together, or separating functions with landscape or topography when they were dissonant. These design recommendations remained useful and constant even as styles and architects changed.

As early as 1865 the elder Frederick Law Olmsted was in California examining the site at Berkeley for the University of California. It was unoccupied territory in those days, which led Olmsted to report, with a fine sense for the impact of urban growth, "...first requirement of a plan for its improvement is that it should present sufficient inducements to the formation of refined and elegant homes in the immediate vicinity of the proposed college buildings."[30]

The landscape architect's touch time and again is the saving grace in the monumental plan. The results of the landscape architect's work still give delight today to

...se who pass through marble arches of the ...ssic plans, unable to read the Latin overhead, ignorant of subtleties in style, and in an old sense more Goth-like than the architecture itself. If the history of college architecture is yet to be written, the valuable contributions of the landscape architects are even further from being adequately recorded.

23A
University of Kansas, 1896
Buildings raised without overall plans occasionally left the campus design without form or flavor, as universities grew from small beginnings to large enterprises.
23B
Air view of campus 1962.
1892 buildings are located near arrow.
24
City College of New York
Main buildings by George B. Post (1903). A strong site composition and clear interior plans marred by finicky detailing.



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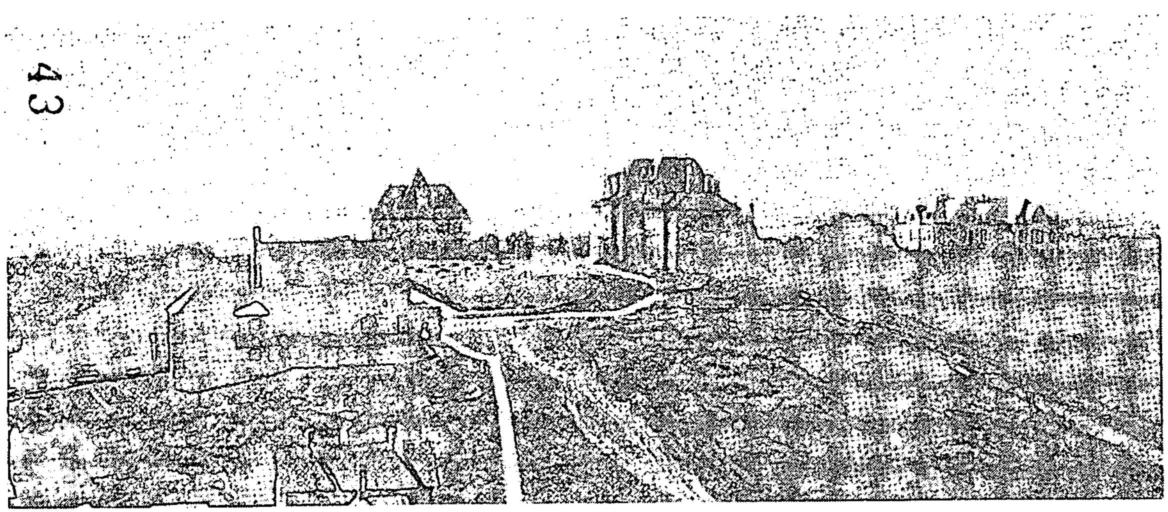
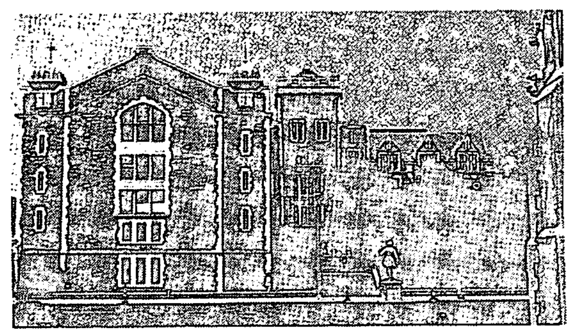


23A



24

The Hearst Competition and Berkeley
Architectural anarchy followed the dissolution of the grand plan concept. The derangement can be partially traced in the development of the University of California campus at Berkeley. Not that Berkeley had the worst of it, but the trail is convenient to follow, and knowledgeable people have written along the way.

Olmsted's recommendations (1865) eventually were used for establishing the main entrance and major roads to the Berkeley campus. The general lines laid out were reinforced by David Farquharson's scheme (1870) for "six monumental and spacious buildings"—a plan which guided the growth for twenty-five years.

Later, Bernard Maybeck was asked to do a master scheme, but he skittered around the problem of designing a university for commuters and suggested an international competition. Through an influential friend on the Board of Regents, Phoebe Apperson Hearst was persuaded to back the commission, and an international jury was selected. No expense was spared. Topographic models, photographs, and elaborate instructions in four languages were sent around the world. The influence of the Chicago Fair and the City Beautiful movement that followed was not lost on the sponsors. They stated that ". . . in fact, it is a city that is to be created — A City of Learning — in which there is to be no sordid or inharmonious feature . . ."[31]

Eleven *premiated* winners were invited to visit the site before the final submission. Two didn't accept, and one of them, Emile Bénard, received the first prize. Finally forced to see the grounds on which he placed his composition, Bénard revised the plan to fit the site. (Composition is an apt word, hinting at the literary qualities that Benard's style reflected—since the first meaning of the word relates to imaginative writing, not architecture.)

Local criticism of his plan was too much for Bénard, however, and he returned to Paris after a short stay in California. John Galen Howard was then appointed architect-in-chief, and for seven years continued adjusting program to site until finally the Bénard Plan was no more. In 1914 the Howard Plan was officially adopted. The major features picked up the thread that Farquharson had already established.

As long as growth could be harbored by single buildings, money was available to erect monuments, and the city didn't impinge on the campus, the plan could succeed. The prospectus for the competition suggested that ". . . there would be no more necessity of remodeling its broad outlines a 1000 years hence than there would be of remodeling the Parthenon, had it come down to us complete and unimpaired."[32]

But the binding forces of a unified style and strong site composition would not be stilled, even for two decades. Designed originally for monumental granite, building details gave way to concrete, and concrete to clay. Each architect fitted in his own building as best he could, and even the space-organizing axial development was dissipated, though fortunately the view to the bay remained.

The search for appropriate building sites and the realignment of circulation elements were the major features of the planning efforts through 1956. Several things then became apparent to the administration. An over-all physical design was lacking because building decisions were being made on the basis of incomplete assessments of future growth needs. The size of the campus development program required a fulltime professional staff. A comprehensive plan was needed to co-ordinate campus development with that of the community at large, especially as some expansion would have to be accommodated outside the existing campus boundaries.

Addressing itself to these matters, the 1956 long-range plan measured the needs for a student enrollment of 25,000, established guidelines for growth to that number, established policy on land acquisition, and set in process a method of planning which enabled new conditions and requirements to modify the general direction given by the plan. By 1962, as scheduled, the 1956 plan was thoroughly reviewed once again and sharper definition was given to matters of building location, the relationship of programming for physical development to academic planning, the co-ordination of growth on central campus with that of holdings not contiguous, and the establishment of an action program on the campus landscape.

The Aftermath

The classic impress spurred by the Hearst competition, well-publicized as it was, spread from coast to coast. From Berkeley to New York City, "Heaven's first law" was set in place on city blocks and rural fields. Not just imposed in such disparate regions as Louisiana and Minnesota, but also exported by American architects in their plans for the American College in Madoura, India and the Canton Christian College in China. The War College in Washington, New York Juvenile Asylum and the Home for Disabled Volunteer Soldiers—any collection of buildings followed or led the pattern of form-giving that was occurring on the campus. By 1929 at least a quarter of the two hundred leading colleges and universities had adopted some sort of plan.

For a while, at least, once the plan was adopted, the architects could sometimes rely on autocratic college presidents to keep it intact. When research laboratories began to defy the mold, presidents could put the buildings with the university heating plant, or relegate them to the lower end of the hierarchy of site choices. Unfortunately science buildings were too often wrapped in a Roman toga or put under the roof of a pseudo-Nassau Hall (still being constructed after two centuries). In either case their design was so badly compromised that students, science and structure all suffered.

Strong presidents could also use the plan to keep faith with donors, for the official tastes had not yet turned away from historicism. Thus the acceptable dictum would state: "...the skyscraper has created in larger cities a new style in architecture adaptive to new problems of housing on small land areas of high value. This is commercial architecture and is not in any way to influence the traditional architecture of the colleges."[33]

Occasionally by 1930 a leading architect would guess that things weren't what they used to be. Charles Z. Klauder, as usual ahead of his time, but never able to go over the edge of intuition into the arena of action, ticked off the "grounds for differentiation" in his book, "College Architecture in America," (1929). They were: "historic traditions, sites, climate . . . not only in general plan and the posture of buildings, but upon the materials of building, character of student body, the method of teaching and the special branches taught, and a remaining condition as important as any . . . location with respect to immediate community."

C. S. Bird posed the larger question nicely at Harvard in 1915: "Town Planning—Why not University Planning?" Bird wanted this as a joint effort, a point of view on which community and University in Cambridge, Massachusetts, have yet to reach rapprochement. Klauder saw this planning relationship in terms of separating the campus from incompatible environs and the siting of single structures; for example, the auditorium near the street car line for both public and student use. But as long as the edge-to-edge relationship was limited to a few urban institutions, the issue of town-gown planning would be buried.

Writing in 1931, one campus planner felt that the college "should be considered as though it were a lake. In fact an ideal location for a university would be on an island large enough to care for all the academic work and connected by a short bridge with a municipal business district, which would be the point of contact between town and gown, with hotels, dormitories, fraternities and boarding houses in the immediate vicinity."[34]

Commented another: "...first and foremost comes the necessity of building up character in the youth of our land; and from a practical standpoint to fulfill this 'function,' an architect must choose one of the period styles for his medium of expression."[35]

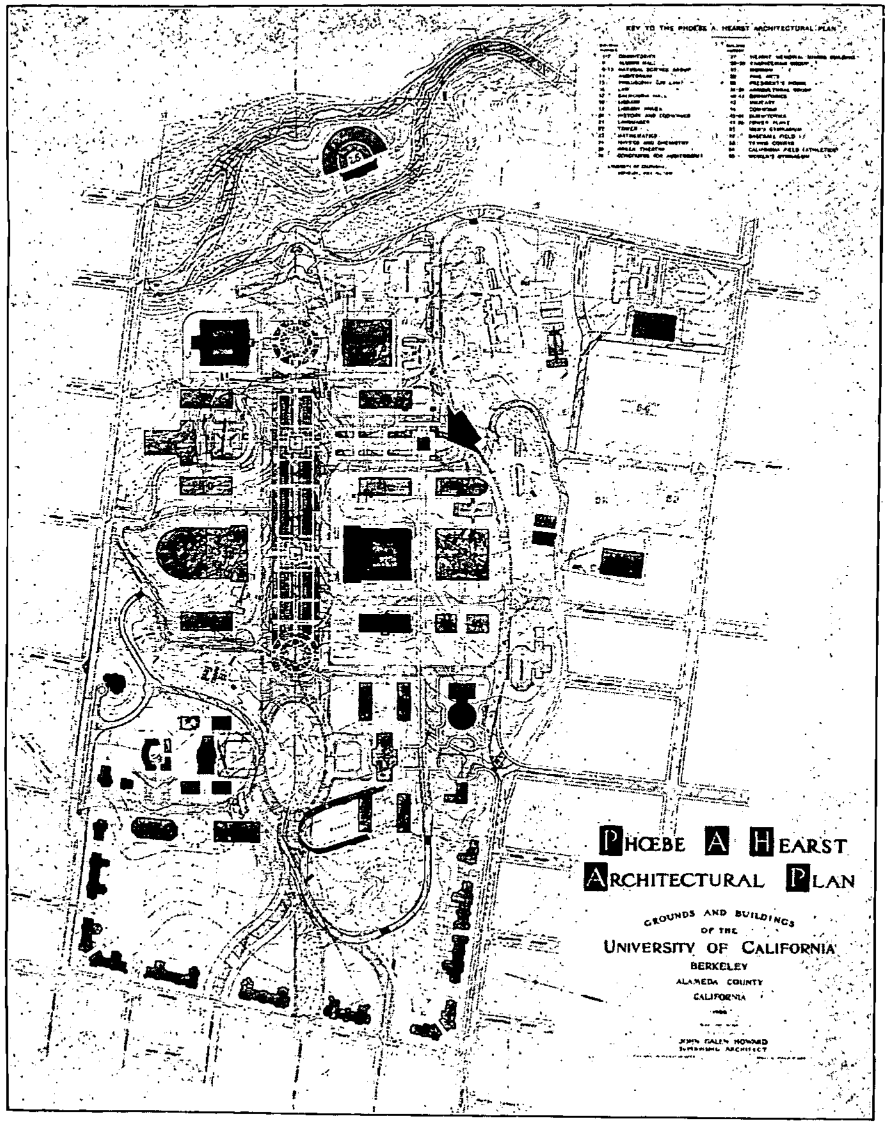
In the debates on styles and analogies on the relationship of the campus to a community, were the important attributes of higher education sufficiently grasped? Had the college and university ceased being ". . . the Home of lost causes and forsaken beliefs, and unpopular names, and impossible loyalties"? (Matthew Arnold) Were the important distinctions being made in applying classical solutions in civic design to the campus?

Olmsted called the antipathy toward recognizing change a "constitutional disability" because "such schools and colleges have grown from small beginnings in a healthy, natural fashion; feeling their way, step by step; conservative of the pleasant traditions, customs, and associations that are part of their history, and there is associated with this pleasant mental atmosphere a natural disinclination to anticipate great change and so forestall their embarrassment."

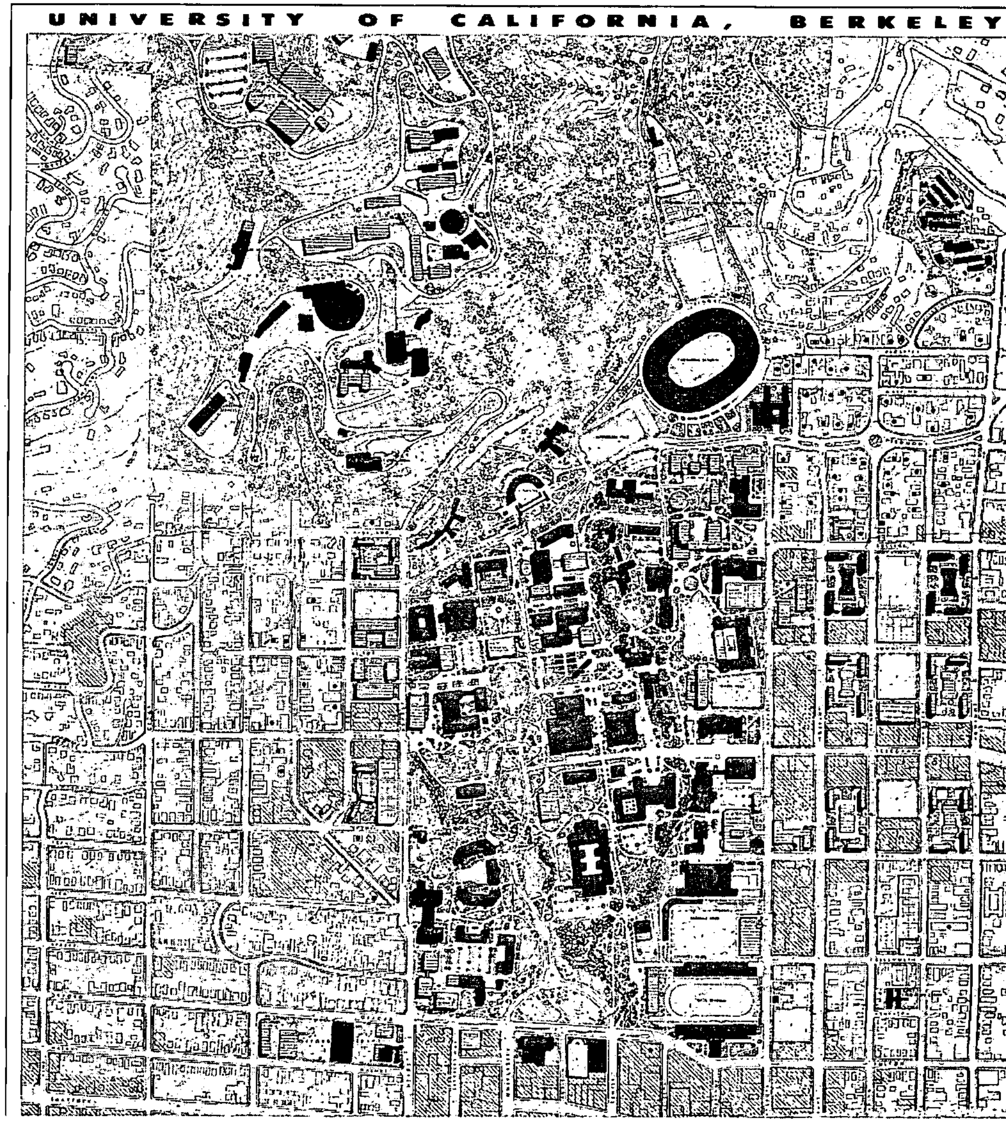
Joseph Hudnut could forgive the architects for not catching hold of the fresh winds from abroad, or even for echoing Oxonian and Medieval scholasticism in the structures they designed; but he and other critics found no excuse for failing to examine the institution to which architects were giving form. Klauder in 1929 claimed that "education is largely built upon the achievements of the past." The same year a more perceptive mind would assign a different role: ". . . the task of the University is the creation of the future" (Alfred North Whitehead).

The professional leaders in the 'thirties believed the importance of the plan "lies in the fact that it represents a logical solution to architectural problems," disposing present buildings and designating future sites.[36] William W. Wurster, in the late 'fifties, saw the plan in another light: ". . . the fundamental idea is that all concerned with university growth have a planned method of participation."

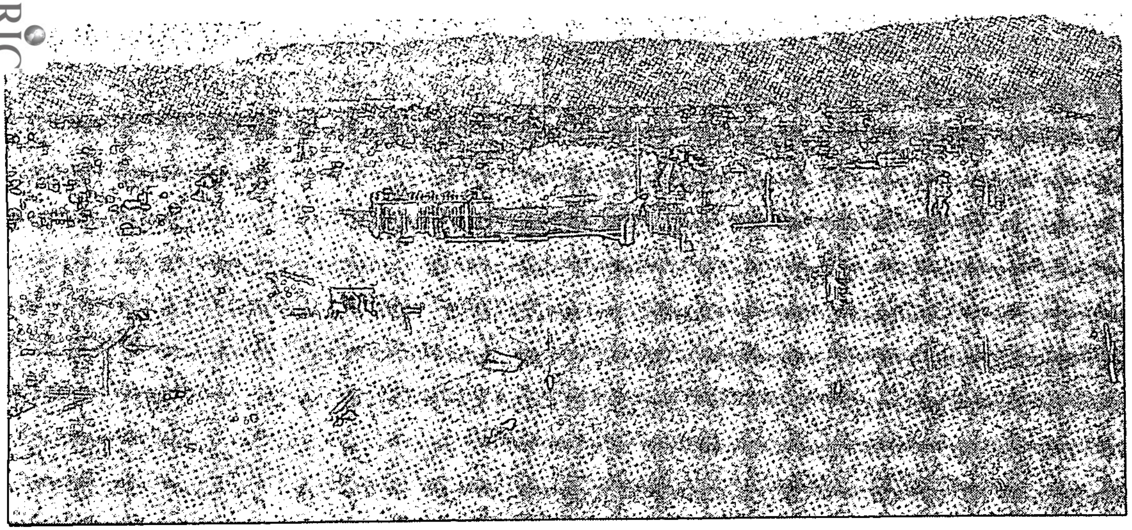
Not that Wurster would assign the architect alone to engineering consent on what was to be done. His consulting experience indicated other problems which the plan concept could resolve: appropriate physical relationship of one department to another, the selection of architects on the basis of competence to handle special programs, the joining of new and old architecture into a comprehensive design, the constructive recognition of the new mobility brought about by the automobile and in turn its effect on campus design.


KEY TO THE PHOEBE A. HEARST ARCHITECTURAL PLAN
PHOEBE A HEARST
ARCHITECTURAL PLAN
GROUNDS AND BUILDINGS
OF THE
UNIVERSITY OF CALIFORNIA
BERKELEY
ALAMEDA COUNTY
CALIFORNIA
JOHN GALEN HOWARD
SUPERVISING ARCHITECT

25A


UNIVERSITY OF CALIFORNIA, BERKELEY

25B



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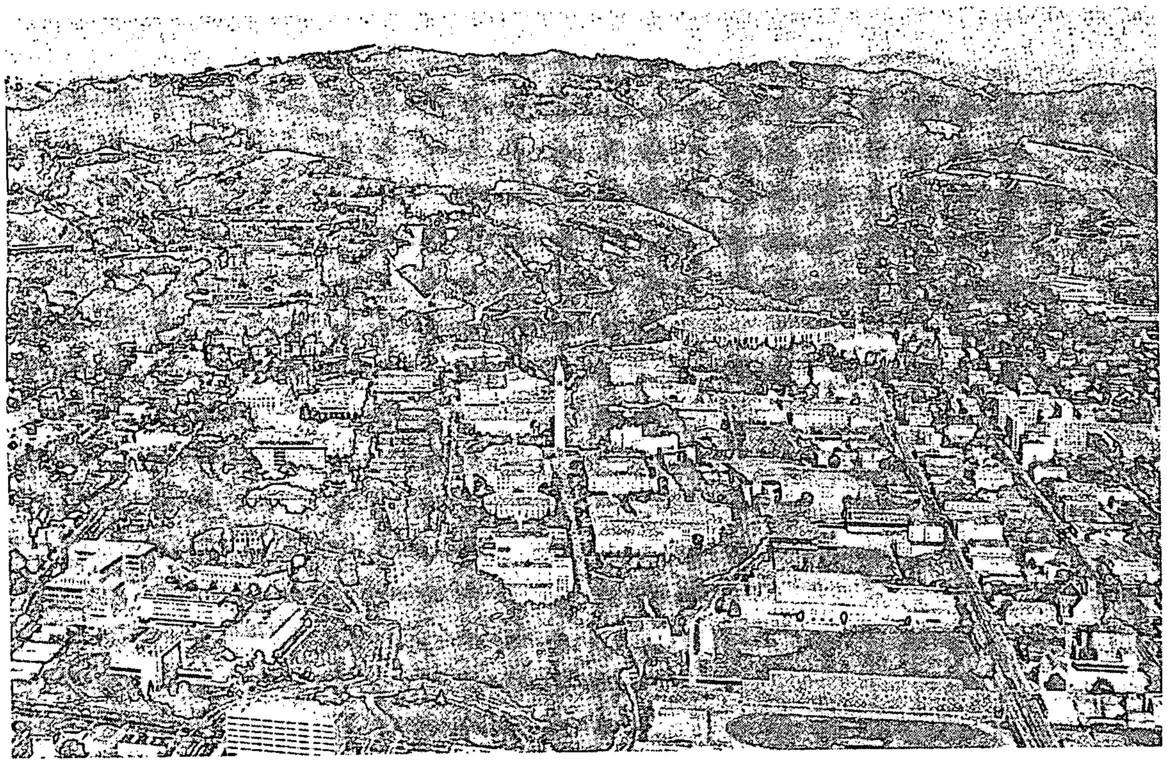


25D

The University of California at Berkeley

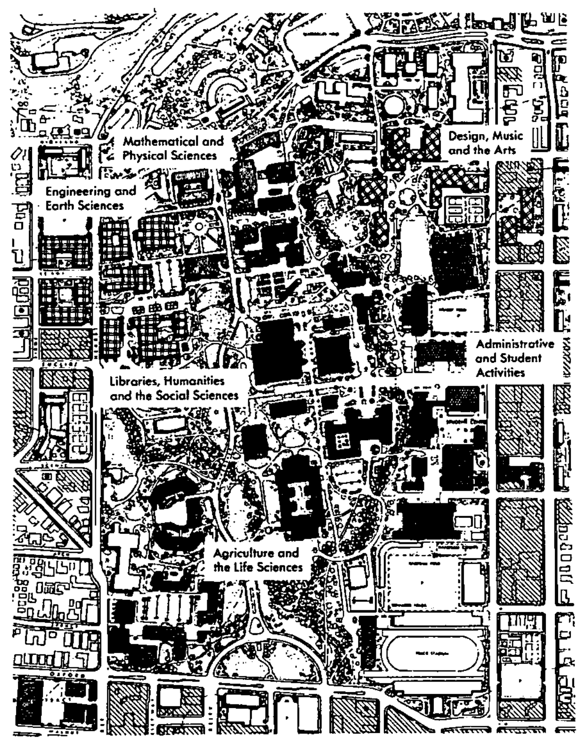
25A
The Bénard plan revised by John Galen Howard 1908.

25B
Long-range development prepared in 1962. The campus has expanded beyond its original boundaries, vast building programs have been completed and new designers attempt to continue to weave together buildings and spaces into the single fabric which is the campus. In the 1962 plan the proposed buildings are shown in the lighter colors.

25C
View of the campus, circa 1890.

25D
The campus, 1961.

25E
The organization of campus buildings into related centers of learning, a major planning concept introduced by 1962 plan.



25E

CURRENT PROSPECTS AND PROBLEMS IN CAMPUS DESIGN

In attempting to summarize the present state of campus design several hypotheses can be framed. First, there are two types of design problems from a historic point of view: problems of structure and problems of content — skeleton and flesh, to use an analogy. Structure is the establishment of a comprehensive design form: content, the question of appropriate style. Historically there have been periods when campus plans adequately reflected both design considerations: Jefferson's plan, Ramées plan, some of the early "classical plans."

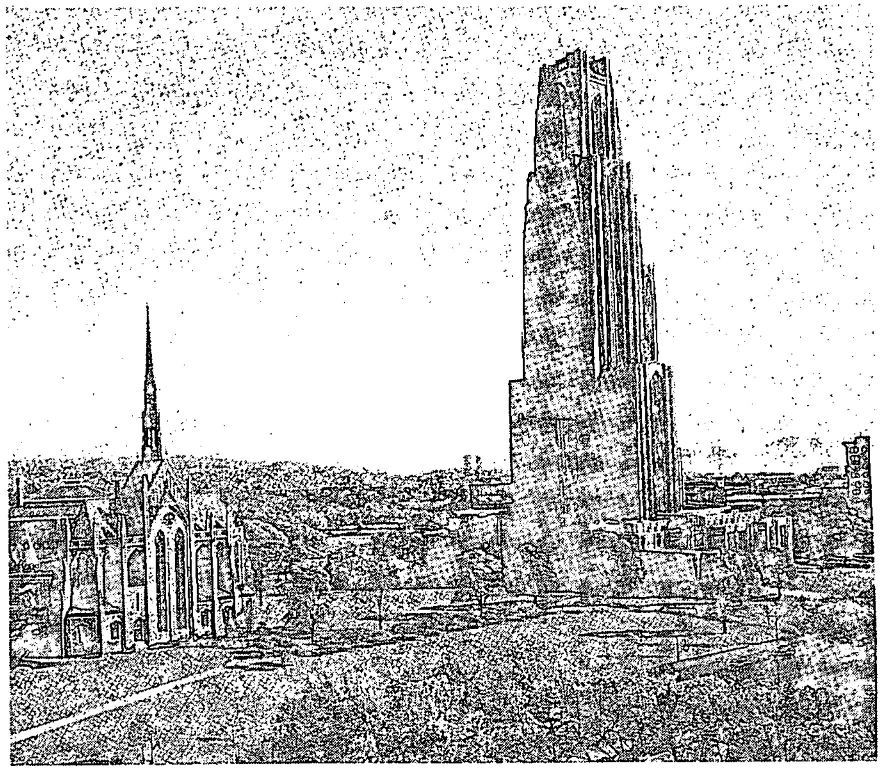
Secondly, the inability of the eclectic architecture to accommodate changes in educational concepts helped bring about a gradual acceptance of contemporary architecture. The revolution in attitudes toward style did not occur because of changes in higher education but rather followed them. Beginning in the late 1920's there were several indications, small but significant, to show that campus architecture would be happily moving away from historicism. Among the signs were these events: the crescendo of debate in educational journals as to whether or not the new European architecture was valid when applied to educational buildings in the United States; Albert Kahn's "simplification" of Herbert Baumer's science building for Antioch College (perhaps the first modern campus building in the United States); Joseph Urban's New School for Social Research; and Anderson and Beckwiths swimming pool at M.I.T., Miës Van der Rohe's work at I. I. T. The great war of 1939-45 was an obstacle to change, but its termination presented an opportunity which was quickly grasped as far as style is concerned and as shown in the many examples of contemporary campus architecture used in later chapters of this book.

Thirdly, the succession in style was not accompanied by a similar transition toward the campus plan (structure) as design. While it is difficult to maintain a perspective on current events, it would seem that the order, coherence and beauty of an over-all campus form — which the classic campus plans undoubtedly had — is missing in many present-day campus designs. There are notable exceptions (mostly new campuses such as the Air Force Academy and Foothills College), but older campuses do not seem to be growing toward any kind of all-inclusive unity.

The current dominance of style over plan may be due to the fact that higher education is again in the process of engineering new modes of education, and the forces behind the change are not fully understood. Not being understood, they are in turn ignored. The impact of urbanization on campus design is one of these special forces; science and technology a second; a growing population, a third. If this is true, then the rich variety of architectural expression which contemporary aesthetics has encouraged may be adequately expressing the changes in higher education. In such a case the pivotal design issue is continuity, and that in turn leads back to the need for some kind of over-all campus form.

It is possible to establish an over-all unity by a selection of style, but the selection of a style is not the great challenge. The first requirement for an adequate campus design is a general design form which can adapt itself to future change, and at the same time maintain its integrity as a design. As this generation may be in the mainstream of two sets of changes — education and architecture — there are no simple answers as to how this objective may be accomplished. However, there is a growing body of experience that may be utilized in guiding campus growth, and in the chapters ahead some useful first steps are given toward the design of structure which is the major problem in campus design today.

Eero Saarinen supposed a campus plan should grow like a baby, in all directions — a dangerous supposition: what will the man be like? A better simile may be the family. It hints at youthful vitality and elderly wisdom, a progression and transmutation—both in educational programs and the physical form which contains the educational concepts.



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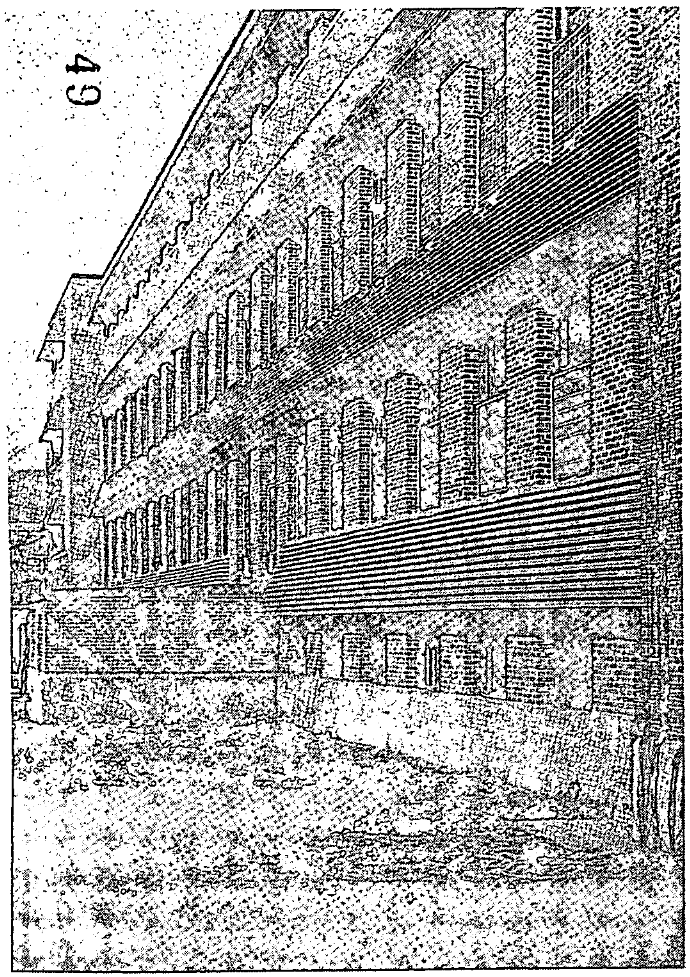

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26
The 42 story "Cathedral of Learning" (1927)
Designed by Charles Z. Klauder. The original scheme called for a quadrangle around the building in the form of three and four story buildings whose aggregate cubic content would equal the tall structure. The ground floor common rooms totaled a half acre. Floors 1 to 3 were designed for classroom and lecture halls; floors 4 to 8, for student activities, student recreation, and departmental libraries; floors 9 to 34, for laboratories, faculty offices, engineering drawing rooms and graduate research. Top-most floor was reserved for the faculty club. The decision on the use of a tower was dictated in part by the size of the site, and its value. The 14 acres were appraised at $300,000 per acre. The program called for a building that would satisfy "the desire for . . . economy, permanence of construction and educational effectiveness . . . the structure is to be a great symphony. Forceful, unafraid, sublime with great sense of upwardness." Left of the tower is Heinz Chapel, also designed by Klauder (1933).
PHOTO: UNIVERSITY OF PITTSBURGH

27
Science Building, Antioch College (1929)
Yellow Springs, Ohio
Klauder met the program and donor requirements for a monumental statement, and if Klauder failed to understand the educational purpose of the building, the fault lies more with the client than the architect. The Science Building at Antioch accomplished about the same time reflects a different attitude than that which permeated the design of the University of Pittsburgh building. The inventor Charles F. Kettering, in donating funds to Antioch College, stressed that "the building is not a monument to anyone, but a place to work." In reviewing Herbert Baumer's first elevations for the building, Kettering felt that the building was too "ivy covered and ornate." To help Baumer understand his intentions Kettering took him to Detroit where Albert Kahn, a personal friend and favorite architect of Kettering, worked over the plans. Kahn made a number of suggestions and refinements which were incorporated in the final scheme, clearing up the eclectic facade and reducing the monumentality of the interior plans. Because form so strongly echoes function the Antioch Science Building might claim the honor of being the first contemporary instructional college and university building in the United States.

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3. Campus Planning

PLANNING PROBLEMS
Statistical evidence can be likened to a telephone directory: there are lots of characters but little plot. Rather than beginning with tabular summaries, the following plot-like extracts of recent consultant commissions have been selected to indicate the scope of campus planning. These dramatic situations have been over-simplified, but they are representative of how physical planning today is expected to provide the context within which typical problems such as these can be resolved.

- *We are proud of our buildings. The unified style has made this campus an outstanding example of the architecture of the period. We have found, however, that the cost of construction and lack of craftsmanship have made it impossible for us to obtain in our new buildings the sensitive detailing which the older facilities have. We must soon build a new classroom building near Founders Hall, in the center of campus. Whatever its design it will be subject to much controversy among our alumni. We hope you will give this issue your full consideration in your review of the various proposals.*

- *The Committee feels that somewhere within this 2000 acre campus there is a site for the Continuing Education building which is close to the student residence halls for summer programs, close to the town's motel district for winter programs, and at the same time advantageously related to the main auditorium.*

- *The City Council has expressed great concern for what is happening along College Avenue. The parking spaces occupied by students force shoppers to the Uptown Plaza, and the storekeepers along the Avenue are demanding that the College do something about this situation.*

- *The National Science Foundation will pay 90% of all costs for building the computer center. At the conclusion of the five year contract period this facility will be turned over to the school for whatever instructional purposes the school desires. The building location hence must serve the contract research area now, and still be sited close to the academic area for later use as a training tool.*

- *We will try to house all our students on campus. Ten year enrollment projections indicate that the numbers to be accommodated will vary in sex (male or female) as much as 15% from year to year. What kind of accommodations should be built and where?*

- *The memorial grove of trees and fountain should form a place of meditation and prayer, where students can pause for a moment of quiet contemplation. It should be as central as possible, yet not impinge on the highest use areas on campus.*

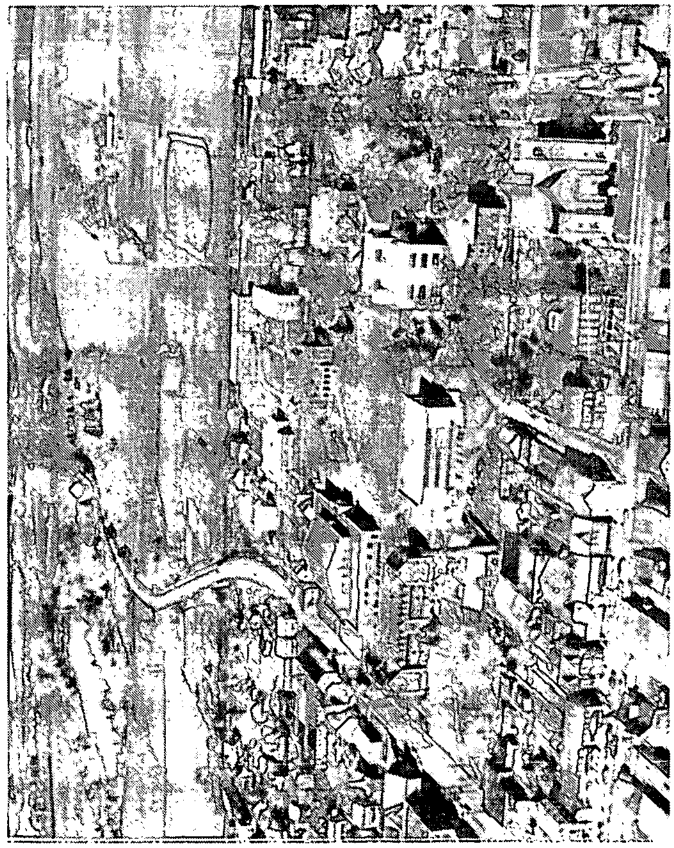
- *The City's long-range plan has given full consideration to the growth pattern around the University, and it is our technical staff's opinion that the proposed highway interchange should be located on school land. We realize this has been preserved for future playfields for the college, but we see no alternative at this time.*

- *The problem can be summarized thus: where is the best location in the state for a new campus for a 25,000 student university? We estimate a land requirement of 1200 contiguous acres. The plan must be staged to accommodate an additional 1500 students each year to the projected enrollment limit.*

- *Our library is well located for serving both day and night student populations. We must, however, expand stack space and reading rooms 30% by 1965. What alternatives are available to us, both in terms of cost, site and library operation?*

- *We are all sorry about this unfortunate stabbing. This office (City Manager) will take all steps to increase police protection in the vicinity of the College. We have also authorized a study of how street lighting can be improved. But as long as the intolerable slum-like conditions continue on the East Side, these incidents will continue. We would like your advice, then, as to whether or not recent Urban Renewal legislation might be applied here, as a joint town-gown planning effort.*

- *How can we best site our new married student housing units? The only land available is a flat field, with no existing vegetation, and separated from the main campus by a major expressway.*



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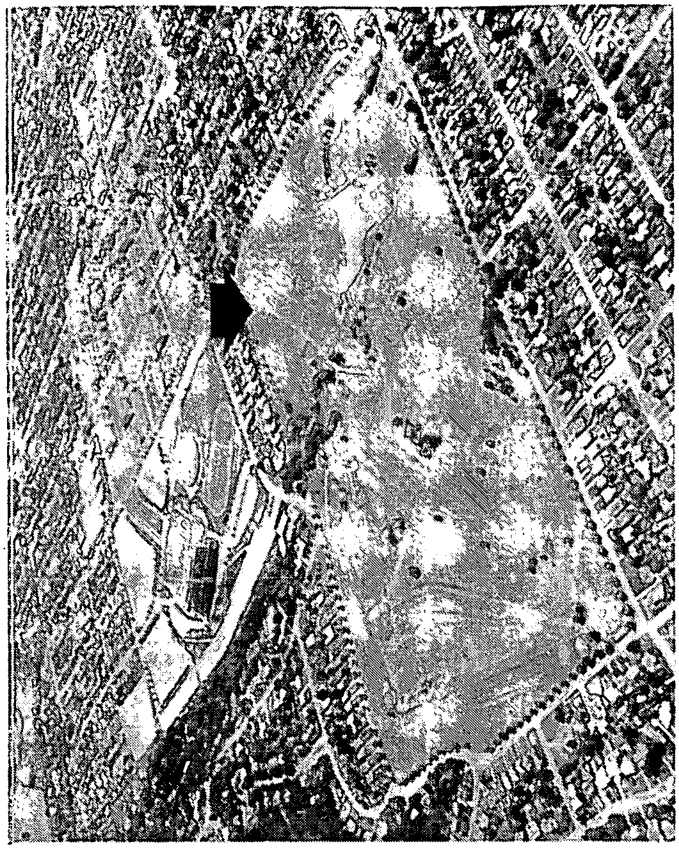

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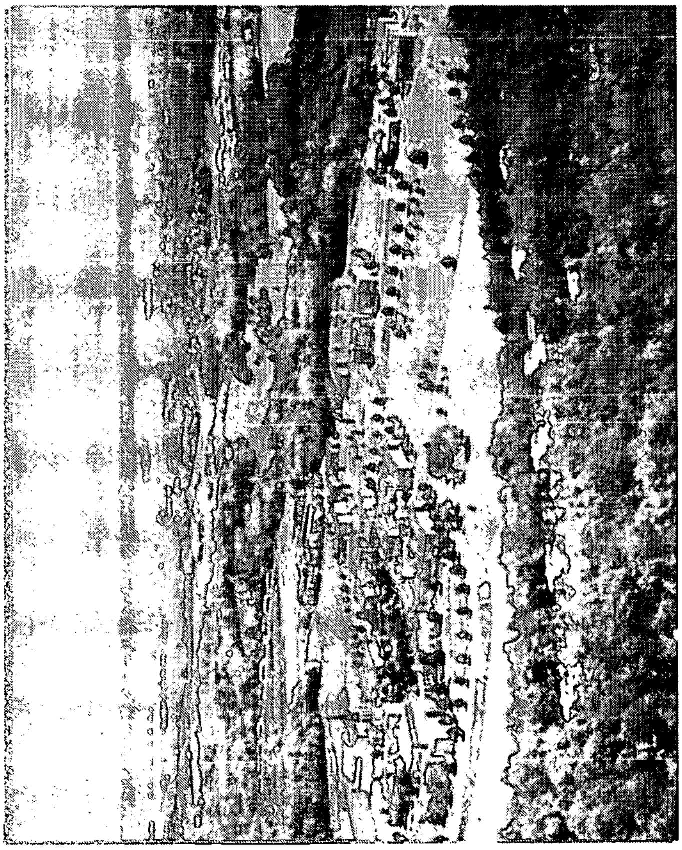

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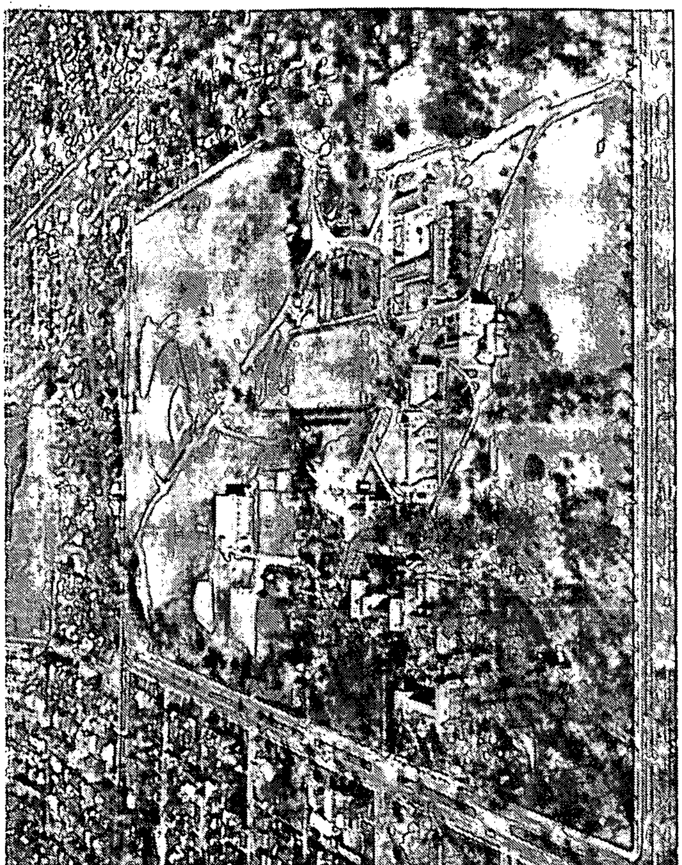


4

Planning problems at the largest scale of campus design

Lebanon Valley College, Annville, Pennsylvania
The town impinges on the campus; land uses are separated by highways and other rights of way. Buildings at each stage of growth have been designed and located without recourse to an overall design plan.
PHOTO: LEBANON VALLEY COLLEGE

2
Texas Christian University, Forth Worth, Texas
The acquisition of the 106 acre golf-course affords unusual opportunities for expansion. Problems to be faced include decisions on how to best use the land, how to connect it to the existing campus, how to handle traffic and circulation, how to respect the land-uses and design quality of the environs, how to design the edge-to-edge relationship of community and campus.
PHOTO: DON BARNETT

3
Wake Forrest College, Winston-Salem, North Carolina
Construction of this new campus began in 1952. The 331 acres and 16 buildings represent a considerable investment in a style of architecture and a method of land planning that leaves few alternatives for future generations to add their preferences in symbols and program requirements to the overall design. Literary ascriptions not physical design have shaped the campus.
PHOTO: GRIGG STUDIO

4
Southwestern at Memphis, Memphis, Tennessee
The campus planners have pursued the dream of an English Collegiate design for a half-century. Unlike Wake Forrest the detailing of new buildings and old has been of a high quality. The physical requirements of higher education, however, are making it increasingly difficult to cram modern technology into medieval building forms. The enclosure and linking of all buildings, the key to the Cambridge, England, designs, will be difficult to achieve. (See page 121.) The cost of future architecture in this style will be prohibitive. There is little relationship of the central buildings to the rest of the site, again unlike the "backs" of the Cambridge Colleges. At the time of transition when caprice must be abandoned, what will the nature of the transition be? Will it turn like the Wake Forrest campus to an enervated imitation of its antecedents?
PHOTO: SOUTHWESTERN NEWS SERVICE

Accepting all these as planning problems it is evident that physical plans must be both general and specific; they must be concerned with immediate requirements as well as long-range considerations; they must cover the campus and environs as well as specific building sites; and they must implement today's educational goals while at the same time encourage if they can, but not hinder, new objectives. Plans — as an instrument by which the campus administration can make good decisions—should reflect the institution's point of view on land-use development, incorporate the widest range of opinions as to how the institution should grow, but restrict such opinions to reasonable alternatives. Plans should aid the architect in successfully completing his commission, give design form to the entire campus, serve as symbol for friends and alumni to support emotionally and financially. Plans must be practical and plans must be imaginative.

So broad and encompassing a view indicates further need for making full distinctions between kinds of physical plans. But any simplification should reflect what the critic Kenneth Burke calls "radiations." Burke notes that it is easier sometimes to see the side streets than up and down the avenue while moving along a heavily traveled road. In searching for clarity through definitions it is desirable to keep in mind the various ways each factor is connected to others in the network of terminology advanced below.

The elements of good planning are fairly well known; a body of information sufficient for the undertaking and as broad a participation as possible in the process of planning. The former comprises all serviceable data from which the future can be constructed. The latter is essentially that commonwealth of effort necessary to finding and supporting a consensus of what the future should be. Within this framework there are divergent approaches today to campus planning. But it is encouraging to note general agreement that planning can bridge the gap between the past and what is to come, translating enterprise into reality. This seems true on campus as well as outside the groves of the academy. Government, business, the individual, all with varying degrees of enthusiasm and skill, have for some time been defining their objectives by matching ambitions and the resources for achievement. Indeed, the process of planning itself has become an instrument for deciding what has to be accomplished.

Planning may be done within the institution for purposes of managing fiscal affairs, selecting a student body, recruiting a faculty, or determining the roles the institution will play in serving God or man, nation or region, male or female, special interest group or the broadest spectrum of a democratic society. In this respect, it would be presumptuous to suggest and difficult to support the contention that physical planning is the only ultimate reality. But once the meaningful discrimination has been made, it is opportune in this book to envisage physical plans as the apex of a pyramid, underlying which are the other considerations. This chapter describes the various kinds of physical plans, and the descriptions in turn define campus planning. As a convenience the words campus plan, physical plan, and institutional plan will be used interchangeably as meaning the end result of planning, at least until further distinctions are made.

TYPES OF CAMPUS PLANS

There are four factors which in combination help distinguish one type of campus plan from another.

1. The span of time reflected in the plan
2. The physical area encompassed by the plan
3. The precision of the program
4. The characteristics of the design

Each of these is discussed below.

Time Spans

The time span of any plan will vary from institution to institution, the following considerations being the determining influences:

1. The number of years covered by the estimates of future enrollments and other program statistics.
2. Capital budget program periods.
3. Degree of control the institution has in regulating growth or acquiring resources for development.
4. The time span of planning programs beyond the campus boundaries.
5. Consideration of special target dates such as a centennial celebration or construction schedules.

Typical labels for planning periods are short-range, middle-range and long-range. Generally they reflect five, ten and twenty year target dates, respectively. The periods can also be expressed in terms of numbers of full-time students expected in each planning period; for example, 2,000, 5,000 and 15,000 students, respectively, for each period. These figures can also be sub-grouped into graduate and undergraduate enrollments, or any other categories that indicate a progression.

The uncertainties of the number of applicants in any one year, the variables in drop-out rates and retention rates, the fact that an increasing percentage of people seek higher education—all these factors suggest that generally plans should be expressed in terms of numbers of students rather than a time increment.

Middle-Range Planning

Middle-range planning provides a systematic way of handling priorities for facilities for which a need is known, but for which a precise determination of program and costs has not yet been made. A middle-range period is desirable in order to sharpen (some say make more realistic) the long-range projections.

There are other important advantages to a middle-range target ten years away. Major changes in educational procedures and the preparation of facilities to accommodate changes may be blocked by tenure appointments, commitments to alumni groups, and campus politics. Middle-range planning can accommodate change by giving adequate time for a consensus and support to develop. It also tends to prevent too rash and too quick an investment in educational fashions by serving as a background for evaluating decisions that have to be made in short-range plans.

The acquisition of resources for future development may be made easier by preparing a middle-range plan. In the case of a private institution, a ten-year development plan has great appeal to alumni and fund-raisers. It is not so far in the future as to discourage those who want to see the product of their philanthropy; and it is not so short a time span that a second campaign for funds has to be launched at the conclusion of the first. For public institutions middle-range plans give the legislature an opportunity for thoughtful consideration of the programs and for sounding out public support for the plans. For the interested citizen there is sufficient time to rally to a good cause.

The middle-range time period can be readily expressed in a three-dimensional design form that bridges the gap between land uses and final building design. When handled reasonably as bulk commodities, designs which express this planning period begin to give scale and dimension to the over-all campus form. Middle-range plans set conditions and limits which immediate construction must meet, as well as being idealized goals which in all probability can be implemented more fully than a long-range projection.

Long-Range Planning

Long-range planning allows some measure of discretion and decision for future generations, yet provides sufficient information for evaluating the change and growth that must be planned earlier. In exceptional circumstances, such as Marcel Breuer's designs for St. John's Abbey (see page 258) long-range plans can be extended a hundred years ahead. Private institutions which are able to control the rate of growth and educational curriculum might be able to plan as far as thirty years in advance, provided their short and middle range planning is adequate. Some institutions will be able to establish their ultimate size. Many junior colleges, for example, are intended to serve a specific population service area. When the population goes beyond a certain point, then a new facility would be constructed, just as with a high school. Where enrollments are limited, long-range planning will be a matter of providing orderly growth and change, the plan screening out obsolete facilities and identifying new needs.

For most institutions, however, long-range planning means facilities for ten to twenty-five year enrollment projections. The mid-point, seventeen years, is a desirable long-range period with a fairly high order of predictability. It may be based on actual births since nearly all who will enroll seventeen years in advance will already be born at the time a new plan is made, or an earlier plan revised. Demographic techniques provide reasonably good bases for twenty-five year projections, but their reliability decreases after the seventeen year period.

Long-range projected enrollments which are expressed in numbers of students can be translated into land-use requirements for base-line planning purposes. These estimates will afford a general description of how much housing, classroom, laboratory, office, library, playfield and parking space will be needed; similarly, they can be used for estimating circulation and utility requirements.

Long-range planning can simultaneous-

ly be a commitment to positive things and negative things. Positive in the sense that as a *process* it continually seeks out conditions which will affect the future of the campus and relates these expectations to immediate and short-range decisions. Some obvious areas of long-range planning, in addition to those mentioned earlier are: a continuous assessment of the total future costs of campus operations, the long-term recruitment of faculty, the laying aside of resources for library acquisitions, the identification (long in advance of need) as to when major fund drives will have to be launched. As to design, simple actions include the beginning of tree planting in the vicinity of areas which later will become major campus paths, or the establishment of buffers and green spaces between various land areas.

Negative aspects of long-range planning can be equally constructive in that they can place restraints on short-term development so that proper provision is made for later years. Restraints of this kind include the setting up of non-building zones so as to maintain desirable densities, the location of land reserves for future development programs (though the magnitude of such programs is unmeasurable), the establishment of permanent easements for future utilities and roads, and other related matters.

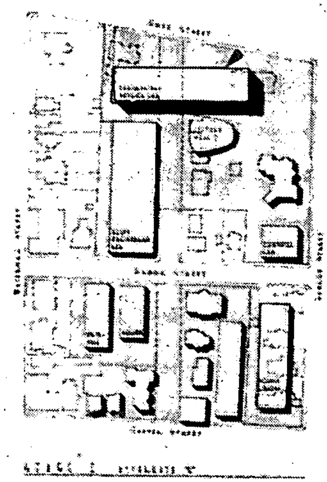
Long-range plans are useful in meeting the institution's obligations to participate in planning in its environs. Too short a planning period here might limit the choices available to the institution, for example, in the instance in which land is felt to be needed for future expansion.

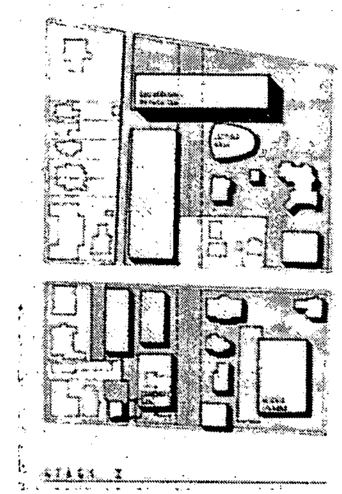
Because of the danger of real estate speculation some institutions will not divulge their long-range plans. But whether or not it becomes public knowledge, a fairly considered long-range plan can set the background for immediate and middle-range planning decisions. The price paid for a key lot may (or may not) be reasonable when examined in the light of future needs. Not to be denied, either, is the probability that the institution will outlive its neighbors. Such an ability presumes that within a twenty-year period, either circumstances presently unfavorable to the institution can be adjusted, or alternative choices can be made.

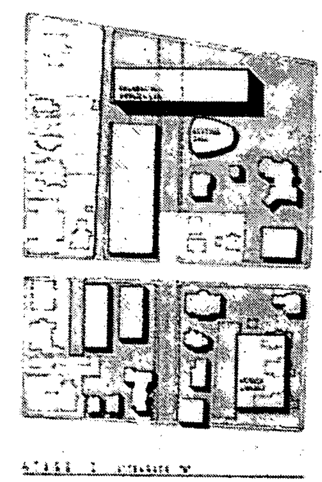
Short-Range Plans

Short-range plans are definitive commitments to build a facility or improve the land, and as such cover the time needed to prepare and justify a building program, prepare designs, and complete construction. Time spans reflect such variables as the complexity of the building and the amount of administrative and/or legislative approval needed as a project moves from the beginning of programming to the ribbon-cutting ceremonies. Construction schedules greatly influence the length of short-range planning. Schedules are related to the school calendar, particularly the opening dates of each semester. Because lead-time is so important, colleges and universities have found it helpful to use capital improvement budgets as a tool for measuring the duration of the short-term plans.

Capital budgets are master lists of specific building projects and other major capital expenditures for the physical development of the campus. Reviewed annually and extended for about five years at a time, the capital budget program is usually accompanied by an estimate of project costs, proposed construction schedules, and an analysis of the financing of improvements. The capital budget can pick up middle-range projects and give them a priority in short-range planning as well as incorporate sudden demands.







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Studies In Staging
Short, middle, and long range planning considerations are evident in these studies of the alternative staging arrangements for the development of an engineering and science center at a major urban university. The final solution depended on a judgment as to whether or not the university would be successful in acquiring property in time to complete the construction program.
Studies courtesy: Sasaki, Walker & Associates, Inc.

Areas Encompassed by Campus Plans

A narrow definition would confine campus planning to land owned by the institution as if it were a self-sufficient monastic enclave. This is a dangerous and incongruous assumption. In very important ways the institution is affected by physical planning outside its boundaries. At first glance this issue appears to be what Frederick Law Olmsted called a "question of adjustment between a suitable degree of association with the active life of that part of the world not given to the pursuits of scholars."

Theoretically comprehensive planning in each geographic area includes (at least) consideration of the land use and circulation requirements of the individual institutions located within the jurisdiction of whatever agency is doing the planning. At the turn of the century three out of a hundred people in the age group 18 to 21 were enrolled in higher education. In 1960 the figure had soared to thirty-seven out of a hundred. Has the conceptual approach to community planning fully recognized this impact on land uses?

In some places today land-use maps, a basic analytical tool for community planning, have colleges and universities in a catch-all category called semi-public or institutional uses. This comprises without differentiation churches, hospitals, libraries, police stations and town halls. (Even less helpful is the category *semi-public open spaces* which is used to embrace golf courses, cemeteries and flood plan zones.) One community which carried eight residential classifications on its land-use maps had a single category for both a technical institute and a small seminary for training monks as teachers. The former had heavy machinery for research and high parking and traffic counts generated by daytime, late afternoon and evening programs.

If this is symptomatic, how well, then, is the land around the institution being planned? To what extent is the following descriptive excerpt of the institution's environs becoming the rule rather than the exception?

*"(We see) the conversion of large single family residences into rooming houses, apartments, and business establishments. A combination of physical obsolescence, overcrowding, and traffic congestion has resulted in symptoms of incipient blight which are apparent today. The narrow lots, high land coverage and existing gridiron pattern of streets are not suitable for the intermingling of residences, commercial establishments, fraternity and sorority houses, and religious foundations currently expanding in the area."**

Colleges and universities are dependent on the community in which they are located for services, supplies, — yes, even students in some places. The appearance of the campus is affected by its environs. Some institutions in the past half-century have moved to new sites because the neighborhood in which they were located was not compatible with the institution.

Housing is a good example of a particular need that links the campus to its environs.

"A wide variety of housing needs, preferences and incomes among university people requires an equally varied choice of housing accommodations near the campus. It must not be surrounded by a gold coast in which university people could not afford to live nor by an incipient slum in which they do not want to live . . . housing must be available for the faculty as well as the students. Over 80% of new appointments are made at the assistant-professor level, and most of these new faculty members cannot afford expensive homes."

Because of this and other "push-pull" relationships it is difficult to establish the point where campus planning ends and another kind of physical planning begins. Lawrence Livingston, Jr., estimates that a campus of 37,000 students, faculty and staff members means a campus-related population of 100,000 people, including the families of people employed to service the institution. The generally accepted projected enrollment figure for 1970 is six million students. This means that about twenty million people

...t that time will have some direct connection with an institution for higher learning. Most of these people will live in urbanized areas. Bulk alone would warrant increased planning for the special needs this population decidedly has in the way of goods and services, and the impact it has on land uses and community facilities.

In the next few years we can expect these conditions in any community in which any viable institution is located.

1. Though a sizable number of new campuses will be constructed, much of the physical expansion necessary for educating the expected increase in enrollments will take place on existing campuses. The densities on campus will rise because of greater utilization of space, the lengthening of the school day, and in some places a year-round school calendar. The pace of activity in the environs will accelerate, the sense of being in a special place may be lost, and the tranquility that came with summer vacation may disappear forever from the university precinct.

2. If the quality of education rises, especially in technology and science, the institution may attract new industry and special services related to research and development. Encouraged and properly guided, this can be a stimulus to improvement (rather than deterioration) of the institutional neighborhood.

3. The economic assets brought by the related or attracted institutional land uses, plus the demand for residential accommodations that are associated with the institution itself, may be manipulated into forming an urban area which in turn can attract a residential population unrelated to the institution but simply seeking a desirable place to live. This aspect of the institution as a generator of urban form has excellent potential in the redevelopment of institutional districts in many of our large cities.

4. Institutions of higher education — public and private — to varying extents will open their facilities to non-matriculated users. This sharing of facilities has special importance in community development if the expectations for increased leisure time are correct.

5. Higher-educational facilities will also afford excellent opportunities for significant urban design. The weaving of campus architecture and open space into the community fabric can symbolically bring together the social and physical subcommunities of campus and environs. The town hall, church, elementary school and shopping center have served as foci for designing sectors of the city. Without subordinating any one of them, the campus can be used as effectively.

Whether issues are posed in a broad philosophic manner or reduced to the technical level of "how will the local streets be able to carry the projected traffic," two things are vitally important. The community must realize the urgent physical demand that most institutions must meet, and begin to plan accordingly. In turn the institution must recognize that its own planning must go beyond the campus boundaries.

*Campus Planning Study for Ohio State University Phase II, 1961

Area Planning

A few responsible institutions have already started planning of this kind, called area planning—planning for the area of its immediate interest. Reginald R. Isaacs' pioneering work at Michael Reese Hospital (Chicago, Illinois) is an excellent example. In the Hyde Park-Kenwood district of the same city the University of Chicago and the Southeast Chicago Commission are jointly engaged in a \$50,000,000 improvement plan for the campus and a \$135,000,000 rehabilitation plan for the surrounding nine hundred acre neighborhood. Columbia University's interests in the rehabilitation of Morningside Heights and the co-ordinated efforts of the hospitals and institutions clustered around the Harvard Medical School in Boston are other examples of what Professor Isaacs would call "enlightened self-interest."

The West Philadelphia Corporation represents the interests of five institutions — including the University of Pennsylvania and Drexel Institute of Technology — who could not afford to, or who did not want to, move from the urban blight that surrounds their institutions. To reverse the downward spiral which has depressed the area and led to an exodus of responsible citizens and business, the five institutions and their neighbors will attempt to co-ordinate planning to meet these goals:

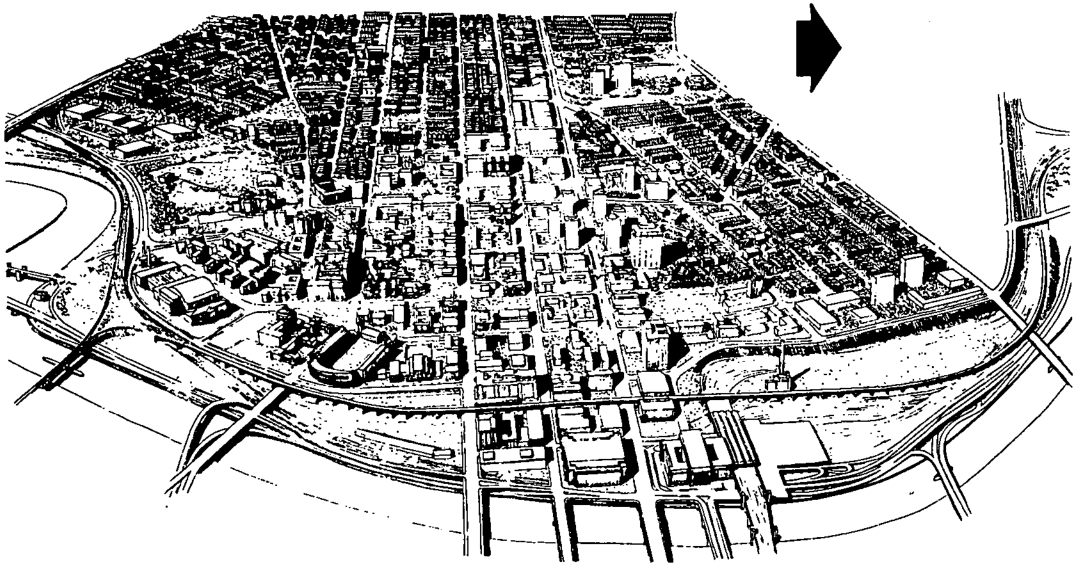
"*. . . the protection, rehabilitation and further development of residential areas enhanced by adequate schools, churches, recreational facilities and public services;*

. . . the preservation and attraction of educational, cultural, health and professional institutions of the highest order;

. . . the maintenance and development of industrial and commercial enterprises and services which are compatible with the institutional and residential patterns."

In Cleveland, Ohio, the thirty-four institutions represented by the University Circle Development Foundation have successfully co-ordinated their own twenty-year development needs and that of the surrounding neighborhood under a single plan prepared by Adams, Howard and Greeley (see page 60). An unusual feature is a land pool from which the individual institutions draw according to their needs.

Area planning has been given added incentive by Section 112 of Title I of the Housing Act of 1949, as amended in 1959 and 1961. Under certain conditions the institution's investment in expansion may be counted as part of the community's one-third (or more) share toward grants-in-aid for renewal projects. Also Federal loans and capital grants are now available for acquiring land for building new educational facilities, wherever such improvements can be shown to be essential to the development of the community. Recent plans of this kind are shown in Section III, Chapter 7.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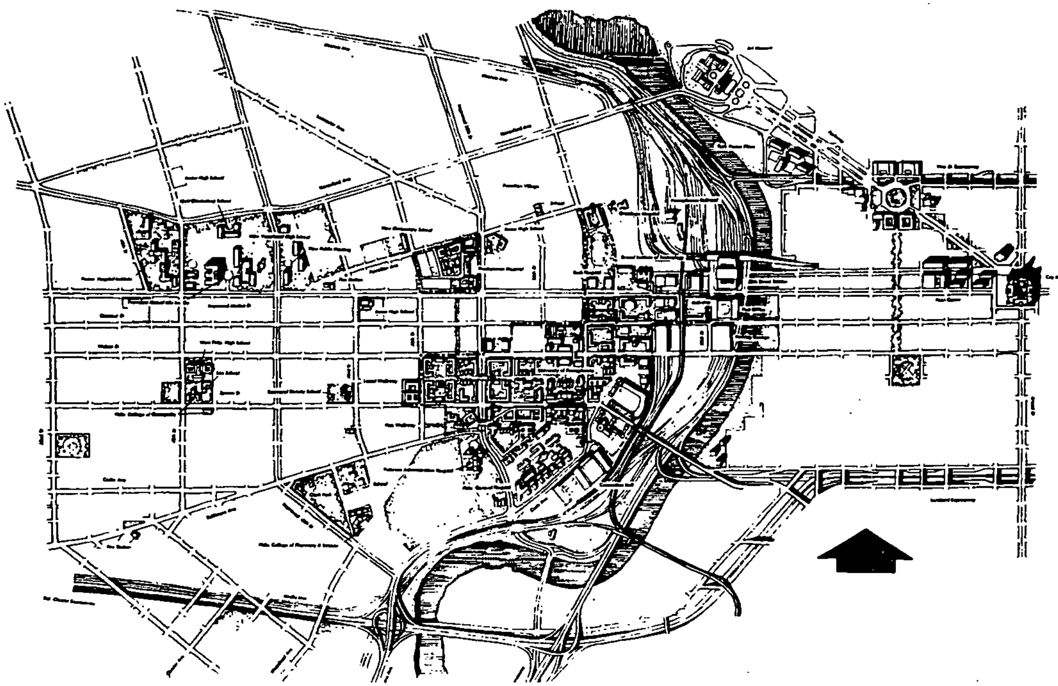

6B

6
West Philadelphia, Pennsylvania
The campus and the community. Problems of stopping the deterioration of older urban areas and beginning a process of revitalization and rehabilitation.
6A
The general location of the many institutions sharing the neighborhood west of the Schuylkill River.

6B
A sketch plan showing the integration of the various institutions into the community fabric. Each institution will have its own identity and physical form, and all sharing in the process of neighborhood renewal in conformance with a comprehensive set of community development goals.

DRAWINGS: TODD AND GRANT ASSOCIATES AND THE WEST PHILADELPHIA CORPORATION

Related Physical Planning
In descending scale of geographic spread there are other types of planning which have direct bearing on the physical development of the campus. Though the Federal government supports several programs in higher education, there is no over-all national plan for the construction of facilities such as that included in 1960 educational reforms in France. The largest geographical unit in which facility planning is carried on as a co-ordinated activity in the United States is the regional group, such as the following:

1. *Committee on Institutional Co-operation of the Council of Ten and the University of Chicago.* (C.I.C.)

This voluntary organization was established to improve educational services by identifying areas of teaching, research, public services which lend themselves, among other things, to co-operative arrangements between the institutions for the purposes of exchanging ideas, pooling resources and sharing the cost of programs which would be prohibitive if undertaken separately by each member. The eleven constituent members of C.I.C. awarded in 1958 ten per cent of all degrees granted in the country, and twenty-seven per cent of all Ph.D. degrees. With a grant from the Educational Facilities Laboratories, much work has been done on developing and evaluating physical plant construction techniques for research building as well as other aspects of campus planning.

2. *New England Board for Higher Education.* The Board maintains a co-ordinated educational program among private and public institutions by acting as a clearing house on regional educational problems. It also acts as the co-ordinating agency for co-operative programs among the six state universities by organizing the planning and allocating the share of operational costs for specialized programs, which the individual states themselves cannot afford to duplicate. Planning is limited, because under the compact approved by Congress N.E.B.H.E. has no autnority or control over member states or

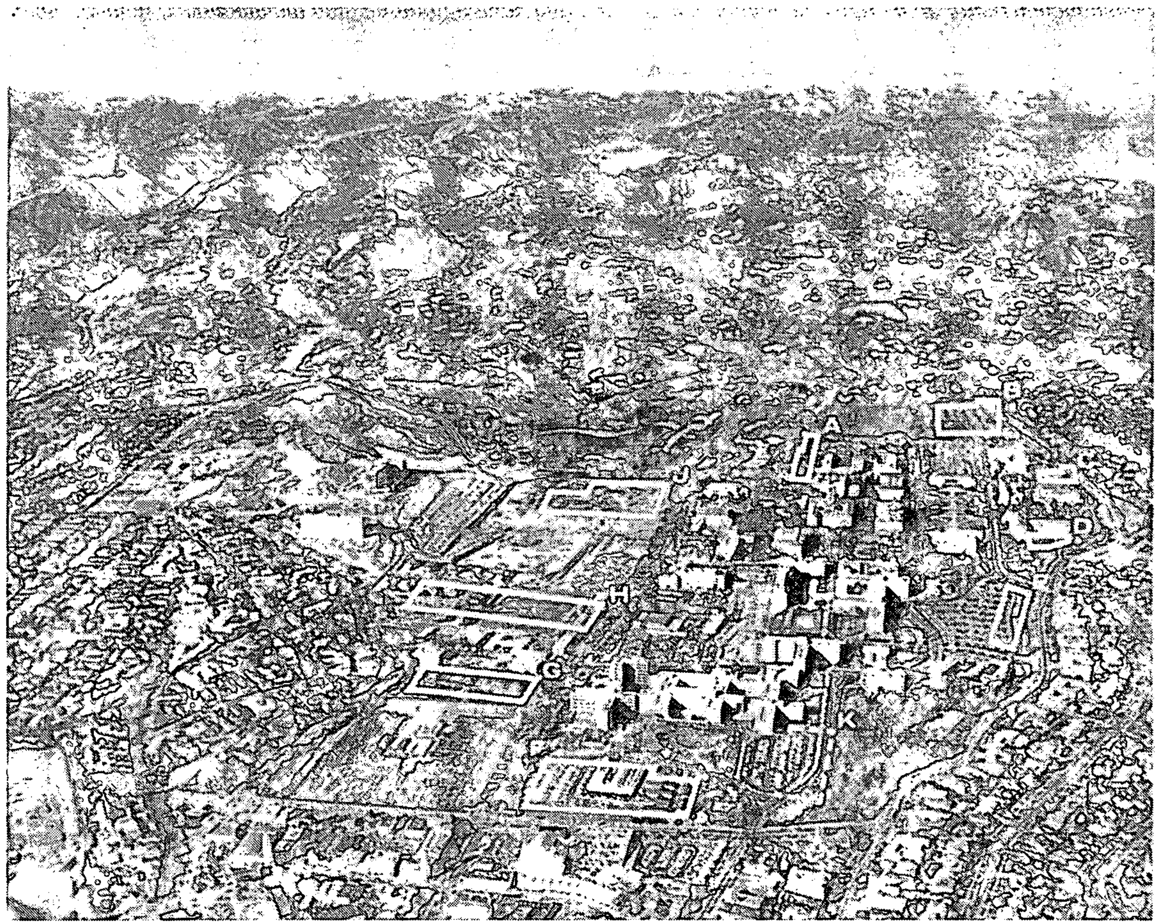
dividual institutions.

Inter-institutional planning also occurs at the intra-state and local levels between both public and private institutions. Most co-operative arrangements relate to the sharing of personnel, cross-enrollments of students from other campuses, and the pooling of administrative data. As enrollments soar, trained personnel becomes scarce, and resources for construction diminish (relatively), inter-institutional planning will become more important. Whether or not this planning will include joint evaluation and programming for new construction is uncertain, but perhaps some indication of what is to come can be seen in the single budget for capital improvements which the four major Indiana universities now submit to the state legislature in lieu of individual budget requests. Some foundation grants and many large Federal grants are made on the condition that several institutions share the facility for which the money is being provided, which implies that some sort of planning is taking place.

The United States reported to the 24th International Conference on Public Education (Geneva, Switzerland, July, 1961) that 153 inter-institutional studies had been reported as either initiated or completed in forty-three states. This compares favorably with the forty-nine studies in a similar survey in 1955. Many of these co-operative programs include facility planning. Some observers feel, however, that much of the informal inter-institutional physical planning involves patchwork concepts, and would not stand up under scrutiny. This would account for the recent strong opposition to a provision for mandatory long-range planning as a requisite for Federal college housing loans.

7A

7
University of California at Los Angeles
The campus and the community. Problems of coordinating growth.
7A
Air view of Westwood, circa 1927.
7B
The same area in 1962.
Institution and environs have developed in spectacular fashion, with little regard for the coordinated planning of land uses and circulation.
Areas blocked out show the proposed location of parking facilities. Parking follows a cycle of development as land becomes limited and densities rise. The stages are: (1) curb and small lot parking; (2) multi-acre parking lots; (3) parking structures; (4) parking combined with other uses in structures.
PHOTOS: UCLA



7B

State-wide Planning

The state level represents the largest geographic area in which comprehensive physical planning appears. The planning mentioned above, while important, tends to be incomplete and partial. The implementation depends on voluntary subscription to the goals and objectives. State-wide master plans, on the other hand, give full consideration to the total demand and formulate their objectives in such a manner that continuing legislation and appropriations forcefully begin to carry out policy and programs. State master plans tend to evaluate all aspects of higher education within the state, though the plan for implementation treats mostly the public institutions.

State-wide master plans will become more important as the percentage of students enrolled in private institutions drops because of the inability of the private institutions to keep pace with the rising number of applications for admittance. Those states which have exported students in the past can expect an increase in their applications as public institutions cut back the number of out-of-state students accepted in order to meet their own local obligations.

Despite this well publicized impending crisis in higher education, less than half the states had completed master plans by 1961. Among these the *California Master Plan for Higher Education* stands apart from all others as a model attempt to plan logically for a growing population. *The State University of New York Revised Master Plan 1960*, though, is more representative of what is being done across the country. The document recommends in very broad terms where new facilities should be located, suggests what curriculums should be encouraged, and prescribes what administrative measures should be started to effect the plan.

Because of past traditions, some states have concentrated their higher education resources on a master plan for expanding a single center of learning. Fortunately, this attitude is changing. The principle of diversity in educational programs is gaining acceptance, as is evident in the development of community colleges and the decentralization of the large state universities. Decentralization here seems to be a relative matter. The Madison campus of the University of Wisconsin expects to grow from a 1955 enrollment of 15,000 students to a 1972 enrollment of 32,00 students. At the same time the construction of a Milwaukee "branch"—for which planning began in 1959—is designed to accommodate 16,000 students by 1972.

The significant emerging principle in state planning for higher education has been concisely phrased in this quotation from the *Governor's Commission Report on the Problems of Expanding the University of Maryland:*

"The State University shall direct its instructional activity toward the assurance of higher education opportunities for every Maryland youth who is capable of benefiting from a college level education, who is willing to apply himself in a serious manner, and who chooses to attend the University.

"Where there are gross inequalities in opportunity for higher education, caused by distance, and when quality college programs can be offered at reasonable cost, new centers should be established."

Types of Plans

Having identified the "overlap" between the campus and the community, and the relationships which other kinds of physical planning have to the campus, it remains to comment briefly on the campus itself as a geographic area.

The word campus may be used symbolically or literally, for a campus can be as small as a wing on a county courthouse, or as large as the many thousand acres of a Rocky Mountain land grant college.

Campus may also refer to the satellite acreage of an instituiton which has noncontiguous areas linked through a single administrative office. A campus of any size may be described by its parts: thus; a housing precinct, a research sector, an academic area and so on. The phrase "central campus" usually means that place which has facilities common to all members of the institution, such as the library, union, administrative buildings, faculty club, and gymnasium. In addition; that is the area where the predominant amount of scheduled instruction takes place. Within the definitions used here, physical planning can be equally relevant to the entire campus, or to a sector of the campus or to the interior of a building.

Types of plans then can thus be labeled by the area which they encompass:

1. National plans
2. Regional plans
3. State plans
4. Metropolitan-county-city plans
5. Area plans
6. Campus plans
7. Sector plans (area within the campus)
8. Building or site plans (area smaller than sector)
9. Floor or room plans.

This book focuses on the last four levels, as ownership and control of land largely determine what can be done in constructing new facilities. The significance of the other levels of planning is recognized now, and full emphasis will be placed later on *area planning* which melds campus and community.

'RECISION OF THE PROGRAM

\ program is a set of directions. It need not be "a line stretched out to the crack of doom." A good rule of thumb is this: sufficient as a map, but not the actual journey. There is an obvious coupling of program to plan, and the essential differences between kinds of programs parallel those differences which distinguish one plan from another: time span, area to be encompassed, and dimensions of the design expected. The characteristics of the first two have been described, and the third is to follow this section.

Whether a volume or a page, a good program should contain two kinds of information: policy and criteria. Policy information consists of all those statements that explain the purposes of the program. The statements are usually labeled as objectives, goals and assumptions. Stated succinctly or in broad philosophic terms, policy statements start a percolation of major intentions and first premises through *criteria* — which are typically couched in arithmetical tables or formulae. Chapter 4, Section III outlines how programs can be organized. The following examples have been listed to contrast *policy* and *criteria*. Some typical policy statements are:

- *The university plan will not impose absolute limits on enrollments unless adequate alternative opportunties for higher education are made available in other parts of the state.*
- *By 1970, the University will house every undergraduate in a unit that is either owned or supervised by the University, and will thereafter maintain this housing standing and requirement.*
- *Facilities placed on the periphery of the campus should be the professional colleges, self-contained research or service operations, and facilities which for some reason would be unsafe or obnoxious on the main campus.*
- *The University will support a public service program, bringing its skills and knowledge to the people of the state through consultation services, extension courses and continuation education programs.*
- *Undergraduates below the senior year will not be permitted to bring an automobile on campus.*

Criteria is a pivotal term. An understanding of its meaning will make easier the application of its substance. The lexicographer, Fowler, offers these words, among others, as synonyms: character, cognizance, differentia, index, indication, mark, prognostic, sign, test, trait and type. In examining two recent planning reports the criteria for selecting a new campus ranged from ten items in one instance to over a hundred in the second study. But common to both studies was an element of discretion that was intended to evoke a creative response from those for whom the program was prepared. Within these limits, then, a program can never be a plan.

Distinctions between kinds of criteria are as important as distinctions between policy and criteria. Some program criteria are fixed conditions, or minimum requirements that must be met — for example, these requisites selected from miscellaneous studies:

- 250 students per housing unit, and no more than 1250 per commons building
- At least 400 contiguous acres
- A renovation cost of no more than $10.00 per square foot
- A bicycle room
- Fifty parking spaces adjacent to the building
- Stack space for 500,000 volumes
- No cul-de-sac longer than 200 feet

Other program criteria are less rigid in their demands, but they can be considered as standards of a comparative nature — for example, in selecting a land for a satellite research installation, these program criteria:

- Cost of land
- Within twenty minutes driving distance
- Zoned for research or industrial use or other non-residential use.

Common sense indicates that long-range plans and the programs for long-range plans cannot be so precise as those made for more immediate construction. Usually the number of variables will increase in any program as the time span which the program covers is extended. This means that it is not usually necessary to establish detailed space programs and illustrative three-dimensional designs for typical long-range plans. Housing requirements, for example, can be expressed in density, acreage, floor area ratios and building heights. These controls are sufficient to establish a design structure in the over-all plan, and reserve sites. To invest more time than this may be wasteful because of changes in institutional policy on admissions, or changes in curriculum, migration, acceptance rates, construction costs or new thought on what constitutes adequate campus housing.

Some critical remarks are also in order for the other end of the time scale. A number of unfortunate buildings have been constructed on campus because imaginative, brilliant and inventive designers (and other designers, too) have not been provided with sufficient program information or direction. An institutional client has an obligation to itself and its architect to allocate resources sufficient to program a new facility in depth. Higher education facilities are becoming more complicated, experiences with new facilities are rapidly burying old stereotypes, and the fixed conditions at individual institutions are so important that no one person can be expected to grasp the requisite details and information. The program — policy and criteria — is an ideal instrument for bringing to the designer or any outside consultant those identifiable basic variables which every institution has, as well as specific requirements.

A thorough determination of what the program is intended to do, and how precise it should be is a good first step in successful planning. The type of plan produced will be measurably affected by the precision of the program.

THE CHARACTERISTICS OF THE DESIGN

The most difficult definition remains until last — *design*. Two distinctions can be immediately made, design as an *activity* and design as a *result*. *Design* as an activity of planning is the second step of two interrelated and overlapping events, first programming and then design. Through observation, at least three sub-categories of design activity may be made:

DESIGN INVENTION	DESIGN CRITICISM	DESIGN REFINEMENT
originate	*analyze*	*re-order*
concoct	*evaluate*	*amalgamate*
devise	*judge*	*clarify*
discover	*review*	*improve*
etc.	*etc.*	*etc.*

We say "interrelated" because design studies may feed back to the program new conditions and circumstances which had not been previously considered; thus the program is adjusted through design. We say "overlapping" because the intuitive and pragmatic aspects of design as an activity may occur simultaneously, singly, or in some order other than the one illustrated above; for example, criticism, invention and refinement.

The results of design may be identified by and will differ according to:

INSTRUMENT OF CONVEYANCE	MEASURE	DEGREE OF COMPLETION
words	*acres*	*sketch*
drawings	*miles*	*preliminary*
models	*feet*	*final*
etc.	*inches etc.*	*etc.*

From these statements one further simplification can be made which might be helpful in the chapters ahead. Planning is the response of design to program, and program in response to design.

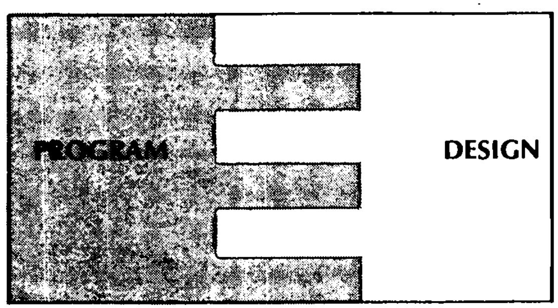
Summary

Campus planning as used in this book is the premeditated guidance of the amount, quality, and location of facilities for higher education so as to achieve a predetermined objective. The objective is the plan. The plan may be illustrated as a physical form. Depending on the type of plan the form may range from a portion of a building to the entire campus and its environs.

Plans may be distinguished by the time span they cover, the area they encompass, the precision of their program and the characteristics of their design. Plans may be conveniently grouped as project plans or development plans.

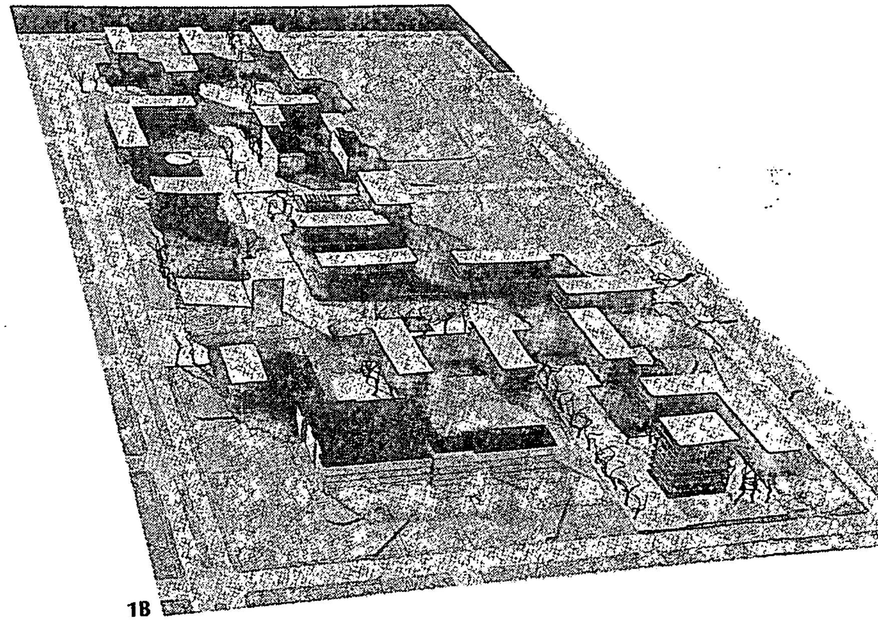
Project plans are strong commitments to action on specific program requirements, covering short periods of time, and usually dealing with some smaller part of the campus rather than the entire campus.

Development plans typically encompass the entire campus, or a large portion of the campus. They cover a longer time span than project plans, usually the middle-range and long-range planning periods. The programs for development plans are less detailed than project plans and the designs are accordingly of a different nature from those of project plans.



PLANNING

II. THE CAMPUS AND ITS PARTS



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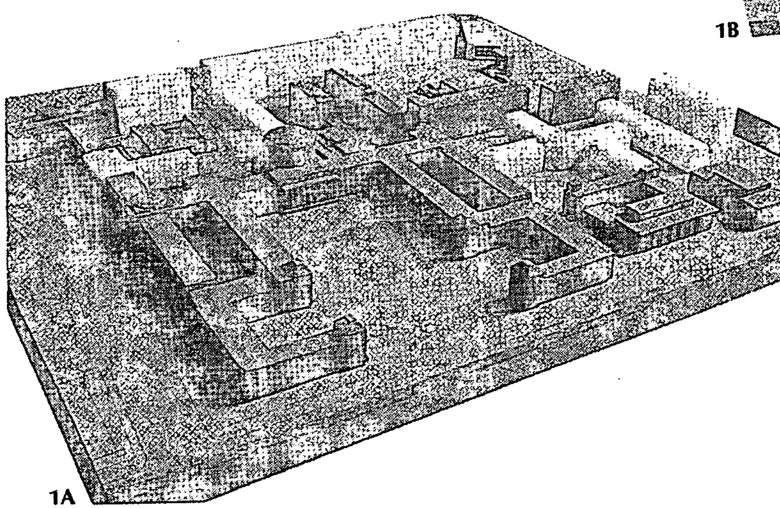


1A

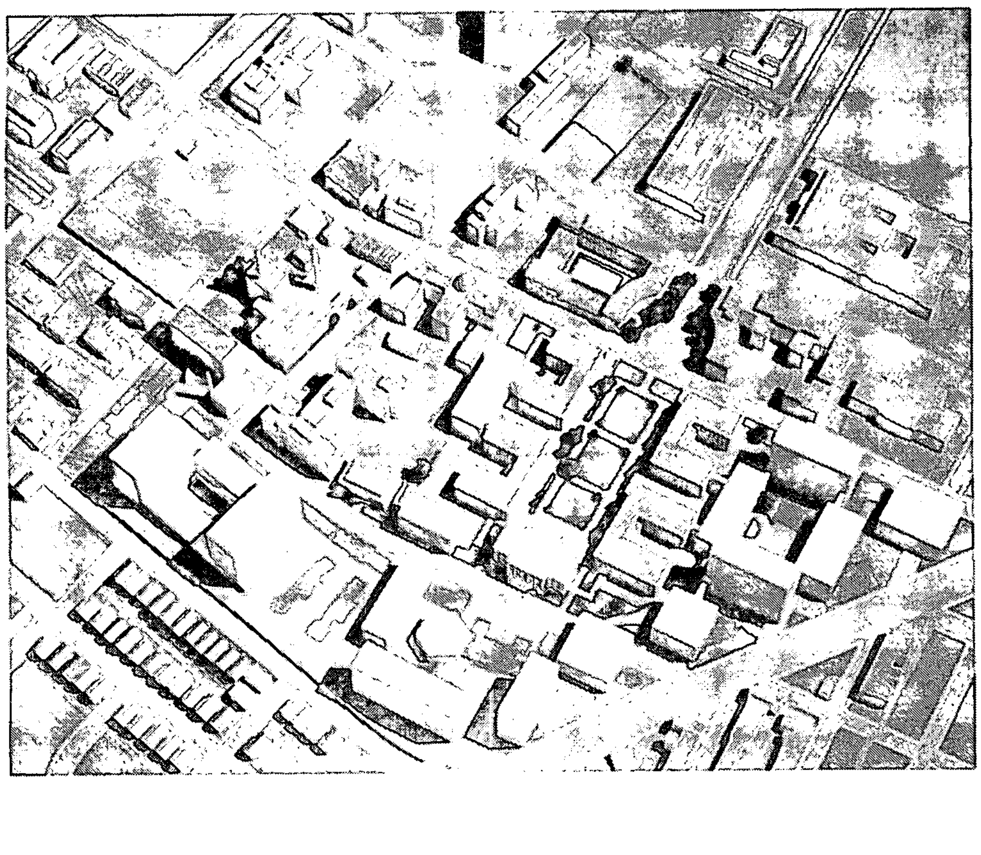
1
Three Dimensional Planning Modules

Planning modules are measured interpretations of programs. In the illustrations shown here they take the form of block-models and are used for the scale relationships between buildings. The degree of finish of the block models varies according to the level of consideration being given in each problem and study.

1A
East Campus Study
Massachusetts Institute of Technology
Courtesy: Sasaki, Walker & Associates, Inc.

1B
Milwaukee Campus University of Wisconsin
Courtesy: University of Wisconsin Planning Office

1C
Harvard Medical School Planning Study
Courtesy: Sasaki, Walker & Associates, Inc.
PHOTO: ROBERT D. HARVEY



1. Planning Modules

In this section of the book the constituent elements of the physical form of the campus will be examined individually:

Instructional Facilities

Libraries and Museums

Research

Centers of Extra-curricular Life

Institutional Services

Housing

Sports, Recreation and Physical Education

Circulation and Parking

Utilities

PURPOSE AND ASSUMPTIONS

There are obvious advantages to examining the parts of the campus because planning attempts to bring all things forward in relative balance. Further, the enigma of campus planning becomes less complicated when smaller problems are identified and compared with others of the same kind. In the chapters that follow, therefore, each of the above categories will be described in terms of programming and design, and then the relationship to an overall plan.

To illuminate the background of the practical suggestions this section has to offer, some earlier comments on planning need to be recast and information that is reported fully in later sections of the book summarized here.

Plans

1. The development plan indicates the arrangement of land uses, the reservation of sites for future construction, the organization of an efficient circulation system, and the establishment of a design structure which commingles aesthetic and functional elements, existing and future, into a clearly defined design form.

2. As a three dimensional statement, the development plan provides a measure of future anticipation. While it will be indeterminate in the further reaches of time, the plan serves as a major tool in making day-to-day decisions when sufficiently conceived. It gives some assurance that immediate construction will not impede a logical long-range growth pattern.

3. Development plans are not ends in themselves, but the culmination of a process of planning in which many factors and assumptions must be accounted. A good analogy is *the plan as the center point*. The set of conclusions, which the plan represents, is only the beginning of another continuing process of testing the plan, and making revisions, modifications and elucidations.

Programs

4. The plan as a design form is a response to a set of instructions—called the program. Programs may encompass a wide number of considerations from regional highway patterns to the preservation of an old oak in the center of the quadrangle. But the fundamental aspects of any program are those relating to the objectives and purposes of the institution.

While the emphasis will differ from one school to another, the general tasks of an institution of higher education are:

a. To provide general education
b. To train professionals
c. To foster creative thought, scholarship and research
d. To disseminate knowledge and skills through extension activities, and
e. To serve as the center of cultural resources for those outside the campus community.

Translation of these implicit goals into explicit physical forms is a complicated and arduous task. The calculation of facility requirements—essentially the multiplication of numbers of people by a space standard per person—is a deceptively simple process until one appreciates the policy implications of campus poulation and the many variations that must be recognized in space standards.

Campus Population

5. Campus population is composed of students, faculty, academic and administrative staff, and other personnel. A statistical model of future population composition, used as a basis for projecting space needs, incorporates assumptions about:

a. total anticipated enrollments
b. distribution of enrollments by level of instruction and subject field
c. teaching, research and administrative loads of faculty
d. average class sizes
e. potential growth of non-instructional functions that support the institution's objectives, and
f. amount and character of auxiliary enterprises needed to sustain the institution's operations.

In gauging long-term population estimates these kinds of factors must also be evaluated:

a. student selection policies
b. drop-out rates
c. recruitment policies for faculty and staff
d. demand for higher education in subject fields, and
e. availability of resources for capital and operating expenses.

Some institutions can control some of these factors, and to the extent that they can their plans will be self-fulfilling prophecies. In all institutions the forecast of campus population is never easily determined.

6. When discussing campus population student enrollments are expressed by F.T.E. (Full Time Equivalent), rather than by head count. F.T.E. is an index fixed by totaling all the course credit hours given (or expected to be given) at an institution, and then dividing that number by the total course credit hours carried by the average full time student. Because space standards differ by level of instruction, F.T.E. students will be grouped by lower division, upper division, and graduate F.T.E. populations.

F.T.E. figures for faculty are also useful for estimating space needs. The translation of head-count to F.T.E. necessitates a statistical analysis of teaching contact hours, research time, special instruction time, average class sizes, and consideration of the special demands imposed by counseling, departmental and committee duties.

In considering the space needs generated by faculty members, we will assume in this book that a straight line projection of existing faculty to student ratios, or an adjustment of that ratio by policy decision, would serve as an adequate base in the long-range plan until the institution could establish its own special standards. Generally this straight line projection method will be used for predicting the numbers of non-teaching personnel.

Space Standards

Space standards consist of an appropriate allocation of space per type of activity per person. Because some facilities can be used by more than one person during any period of operation, a space utilization factor has to be considered in estimating facility requirements.

A single gross square footage standard per person on campus is not adequate for general planning purposes. By breaking down the constituent parts of the campus into program areas, however, and by measuring their individual space standards, a more meaningful appraisal of space standards and space needs can be made. Obviously with so many differentials to be considered, any predictions are filled with qualifications and uncertainties. However, the degree of precision needed to identify the long-range facility requirements is such that reasonable approximations are often as useful for the long-range plan as labored calculations.

8. The most important space standards are those devoted to instructional purposes, though less than a third of all floor area at a complex institution may be assigned to this category. Some instruction is carried on in gymnasia, auditoria and other facilities; but the bulk of the teaching loads is sheltered by classrooms and laboratories.

When suggesting space standards in this book, we will assume that the distribution of classrooms, their student station sizes, and utilization are satisfactory on the existing campus. This also implies that inefficient and outmoded space has been converted to other uses. Additional classroom space needed for a given level of enrollment (whether on a new or old campus) will be computed on standards that include a high efficiency of use and an optimum size for the activity involved.

9. Teaching laboratories have greater differences in their internal space and equipment arrangements than classrooms. Teaching laboratories include wet and dry science and engineering facilities, drafting, music and art studios and other rooms for demonstrating or practicing techniques and experiments.

Sizes of laboratories will vary according to the level of instruction being given and the subject field being taught. Utilization rates tend to be lower than those of classrooms because laboratory sessions involve several hours of continuous meeting. Specialized laboratories in which individual experiments are being conducted cannot be easily vacated for another class. Scheduling is complicated. Also, if a laboratory course is given, a facility must be provided regardless of how often the room will be used.

In this book we will assume standards of high utilization for teaching laboratories. The standards for new facilities will also include an expansion factor of 20% beyond the desired section size for each laboratory, thus allowing a minimum and maximum enrollment to use each laboratory.

10. Space standards for other parts of the campus are predicated on an assessment of probable numbers of people that will occupy a building or outdoor space in an average activity period. Where it is possible to do so, we will use space standards established by contemporary institutions which have used up-to-date analytical methods in estimating their individual requirements.

Population policy and space standards affect every vital point of institutional growth. There are few that can be applied to every institution when such standards are used for determining such things as financial and operational policy. Our purpose is to establish reasonable dimensions for the gross quantities of space that must be included in a general plan. Ideally each institution would set its own standards in the planning process through self-studies. Too often, however, time and circumstances do not permit such thoroughness.

The Planning Module in The Planning Process

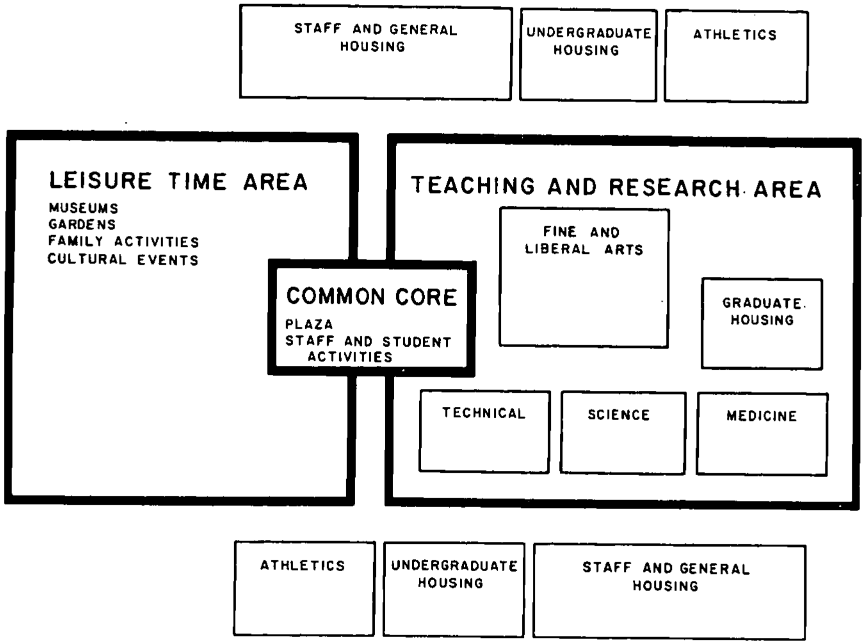
The brief summaries above indicate why comprehensive planning requires full inventories of existing facilities and continual assessments of all aspects of the institution's operations. Elaborate and detailed technical manuals must be prepared for statistical projections of population and space needs. The work leading to the publication of a plan usually takes two years of intensive effort.

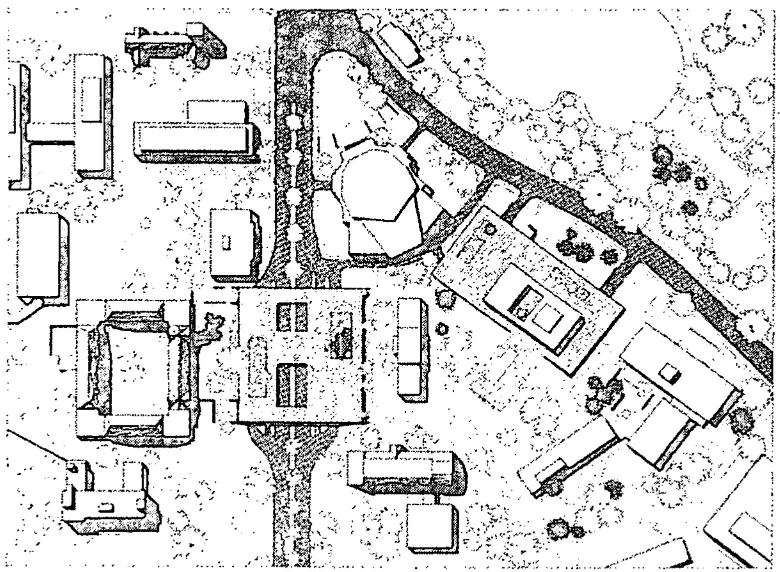
In the interim daily decisions must be made, preferably against the framework of some knowledge of future development. To provide this framework as early as possible in the planning process a pilot plan can be organized (see Section III).

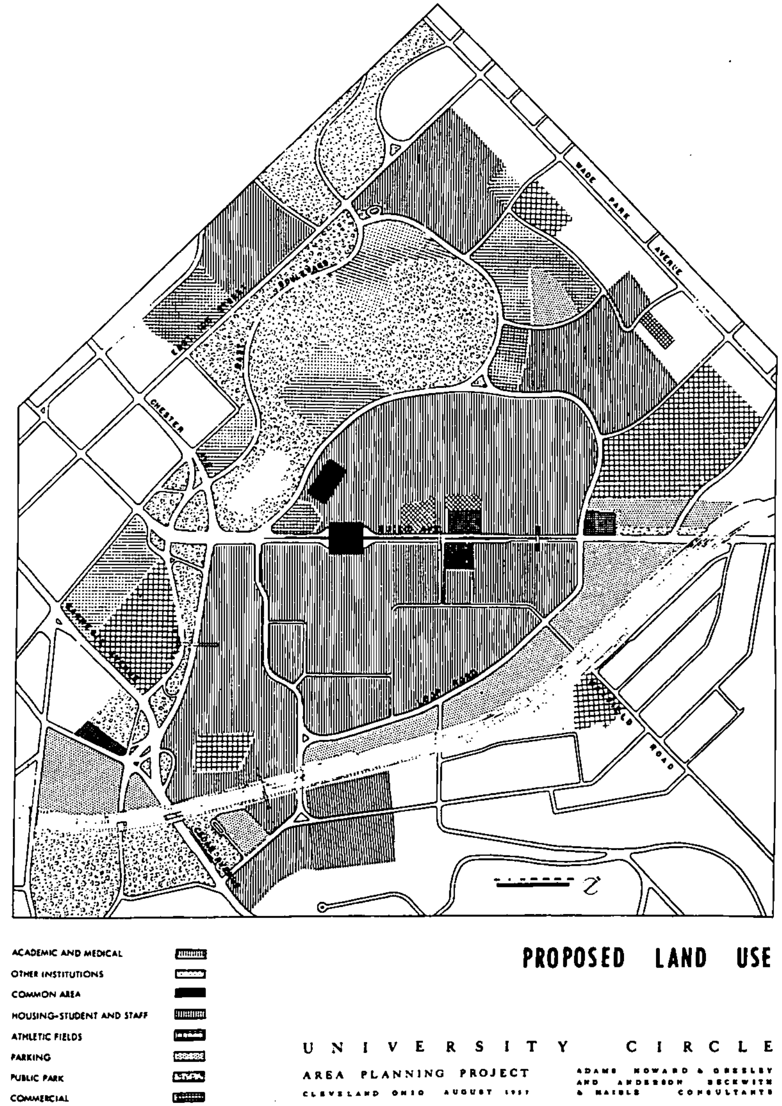
The pilot plan follows a procedure that parallels the development plan, but is abbreviated and synoptic. The key step in this system is the selection of an appropriate planning module. The module serves as a link between the programs for the development plan and the campus design.

Planning modules also can be used in the planning process when institutions cannot organize a depth study of programs for new facilities. Planning modules make it possible to break down the total space requirements into smaller increments. This allows some elements to be programmed in detail, and others to remain as good guesses.

Planning modules can be grouped by functions and related to the parts of the campus listed above. In this chapter the planning module is defined in general terms. Later it will be used as a focus for organizing the facilities that must be represented in the campus plan.







2
University Circle (1957)
A General Plan for the Future Development of the Area. Adams, Howard & Greeley and Anderson, Beckwith & Haible, Consultants, Kevin Lynch, Project Director. The study suggested both goals and steps for unifying a 488 acre district in central Metropolitan Cleveland, presently occupied by 34 educational and cultural institutions. Land uses were organized to conform to the diagrammed (desired) relationships. The three drawings show the progression of conceptualization and the changes in planning modules from abstraction to architecture. Reproduced by permission of the University Circle Foundation.

THE PLANNING MODULE DEFINED

In the sense that an institutional objective will have a physical form, there are three orders of importance in listing the parts of the campus:

1. A building.
2. An outdoor space, either as a separate program function, or as an adjunct to a building.
3. Supporting site elements such as utilities and circulation.

The physical elements of the campus plan are ranked this way because a campus plan states how to use a building and how to occupy land. Utilities and circulation systems are subsidiary considerations. They have no purpose other than supporting institutional activities — but their support is necessary. Some functional outdoor spaces can and do exist for special educational purposes independently of a building, such as playfields, but they do not outrank buildings in importance to the institution. Though land is essential for a campus, buildings are the major elements. Generally it is on buildings and building programs that physical planning focuses. Through site co-ordination and programming, the other elements follow in line.

In describing functional programs for any one physical element, it must be recognized that each campus and each element is an exception to any rule. Definitions in campus planning resemble Rachel Carson's boundary line between land and sea: "...fleeting, transitory . . . forever repeating its encroachments." Yet within the limits of great diversity on one hand, and the need for singular definitions on the other, serviceable generalizations may be made. In the beginning of the planning process these generalizations may be only abstractions. Two come readily to mind—those describing land use and those describing relative location. Lending themselves to mapping and diagramming, these abstractions are useful in showing the relationships between various parts of the campus.

To come closer to the particulars of campus planning, the abstractions must take definite form. Certain buildings, for example, can be given preliminary architectural shape because a set of instructions can be published describing their purpose and space requirements. Many programs in the campus plan, however, cannot be that precise. An intermediary is needed, beyond the level of abstraction, to give shape to a future only vaguely sensed. The planning module is such an intermediary.

A planning module is a dimensioned interpretation of a program requirement.

Planning modules are based on three kinds of information.

1. Identification of the institution's objectives for each general group of activities to be sustained in the campus plan.
2. Determination of a space standard per person (student, faculty, and other) suitable for that educational objective.
3. Estimate of the number of people the planning module will serve at a stated period.

The steps to be followed in preparing planning modules are described in detail in the chapters that follow, but as a simplified illustration the following example demonstrates the methodology.

The long-range plan for institution Alpha is to house all its undergraduate male, single students in campus facilities. It is estimated that enrollments will rise from 500 students to 1000 students during the planning period. About 125 additional new students will be accommodated every two years. A new housing unit for 125 students will be constructed in advance of the expected increase in enrollments. Present housing standards are 200 square feet per student, and are considered satisfactory. The planning program for housing is 25,000 square feet every two years. This space need can be converted into a three dimensional block model or drawn on the plan as a building shape.

Some planning modules can take the form of a building. Others will represent a playfield, or the acreage required for a parking lot. As a representation of the program the planning module is used on the base map or base model as if it were the actual solution. However, the planning module is intended to be a flexible instrument for allowing changes to occur during the planning process. For example, when the planning module is represented as a building, the shape of the module may change as site requirements such as circulation and utility needs are made firm. Changes in the module may be made because of site composition; for example, the heights of existing buildings may require consideration in the preliminary overall design.

The planning module is a chess piece; the campus, a chessboard. Each move has consequences for all other pieces, and there are several strategies in planning which can be pursued with equal success. For this reason, through constant testing, adjustment, and feedback, the program from which the module is derived will itself be refined as preliminary agreements are reached on such decisions as the location of roads, the connections between one building and another, or the order in which the long-range planning is to be accomplished.

Planning modules will vary in precision. The more detailed the program and statement of site conditions, the better the chances for an appropriate solution when projects are executed. But detailed project design is not called for when planning aims for a generalized solution for the overall development. The time and money expended in this instance can be used better in establishing land-use patterns and circulation systems. Obviously, buildings scheduled late in the planning period cannot be given accurate dimensions. But sites and buildings on which early commitments will be made warrant thorough study.

Testing the capacity of the site to accommodate the planning module may imply preliminary architectural design. The recognition of what has to be done to solve the planning problem is no less a professional skill than solving the problem itself. "To make judgment wholly by the rules is the humor of the scholar," wrote Francis Bacon. A decision as to the accuracy required in the planning

module is called for early in the planning process. However, emphasis on a special building in the development plan properly follows a consideration of the whole campus as a design form.

The non-building elements — field spaces, circulation and utilities — pose less of a problem in representation as a planning module than do buildings, mostly because of their relative simplicity. Quantities and uses affect their shape and location. Sports fields have standard dimensions; roads are designed to fit flow characteristics; utilities are a factor of type and size. Non-building elements have great margins of flexibility, and in the hands of a sensitive designer can be manipulated and adapted to site conditions as readily as a building.

Depending on how precisely a program can be formulated, the institution's ability to reach firm decisions, and how far in time the plan is projected, the use of planning modules will bring about results ranging from:

a. confirmation of land-use arrangements
b. confirmation of major circulation and utility locations
c. selection of sites for individual buildings, or the location of portions of a building
d. preliminary quantification of a constuction program for project execution
e. design controls for specific sites
f. preliminary architectural programming for project planning.

The planning module method of testing the program through design has the advantage of illustrating the magnitude of physical construction. It reduces a number of possible choices to a few reasonable alternatives. It redefines the program in terms of potential construction projects. It closes the gap between a physical planning decision that must be generalized and a project that is ready for execution. The project architect may later suggest changes in planning decisions made in the development plans, because of his design studies, but he will start his project designs with a clear understanding of the institution's requirements and design goals.

INDICES AND STANDARDS FOR THE PLANNING MODULES

Indices and standards for each part of the campus have been included in the chapters that follow. The information is sufficient for preparing planning modules for development plans. They can also be used as a checkpoint in project planning, and in gauging the extent of future facility needs when using other methods of campus planning.

As systematic check lists of the types of physical facilities that should be considered while preparing campus plans, they are points of departure, as not every institution will require all of them. Understandably, a number of unique facilities are omitted. Few institutions will plan to include a toboggan slide in their physical education programs, and few will support a high-altitude observatory in their long-range development plans. Special facilities have a way of coming to the center of planning discussions, while basic needs are overlooked. The planning indices help identify the essential requisites, as well as some of the peripheral requirements, and give balance to the planning efforts.

For many of the facilities, a planning standard is listed; this is an increment of growth, on a per user basis. The best planning standards are those derived from local conditions, as these represent existing operations, modified by adjustments for the purpose of improvement or economy. Modifications in standards can also be made by inspecting successful solutions on other campuses or by adopting general standards based on professional consultant advice. The figures shown in this section are properly applied only when local standards cannot be established. They are best used for the purpose of programming pilot plans and development plans. For project plans leading to construction, each building will, of course, have its own special program. Occasionally, the special design characteristics of some facilities make it impossible or impractical to suggest a planning standard. In these instances the adoption of a standard from a comparable institution will serve as a convenient substitute until a preliminary architectural or site program can be issued.

Acknowledging that there may be as many classifications as there are classifiers, the chapters of this book have been arranged to cover situations in campus planning that are typical, thus avoiding endless qualifications which otherwise would be necessary to establish an agreed set of terms suitable for all planning problems. This section constitutes a sketch to be filled out by the reader, with comments sufficient to suggest further inquiries and reflections before applying any suggested standards to a particular situation. The emerging planning and design issues for each facility type have been summarized, and serve as an introduction in each chapter.

A Four Phase Method of Guiding Campus Development

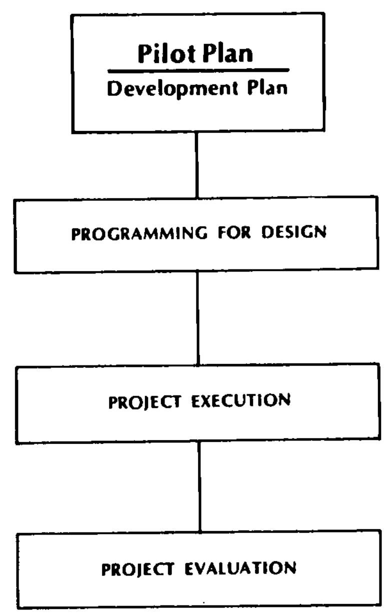


Table 7: A Four Phase Method Of Guiding Campus Development

PHASE 1: THE ORGANIZATION OF AN OVERALL PLAN FOR THE DEVELOPMENT OF THE CAMPUS.

The plan is based on a program which lists projected population and facility requirements.

The plan itself is a design form indicating at least the arrangements of land uses, circulation, and open space structure.

The design may be shown as an illustrative site plan. The programs for future development are thus translated into planning modules, i.e., graphic indications of land coverage and positional relationships of site elements, through the medium of building shapes, or outdoor spaces related to an activity pattern.

The illustrative site plan may also indicate the overall form of landscape development.

The process of planning includes an analysis of site and environs, operational patterns, educational philosophy and other matters which must be considered in effectively translating program needs into design forms.

The overall plan is a guide, to be subjected to continuing refinement as individual projects are executed. It helps encourage day-to-day decisions on the basis of knowledge of the probable future pattern of campus development. The consequences of any one action can be realized in terms of its contribution to the total design.

Campus planning may be divided into two stages. The first is a *pilot plan* which is an initial reconnaissance of problems and probable solutions. The pilot plan attempts to bring all aspects of campus development forward through time in relative balance with one another. It enables the institution to guide its daily actions through an interim overall plan.

Stage two is a comprehensive approach to the overall development, and requires consideration in depth of all aspects of program and development, including policy determination of campus population and facility standards.

PHASE 2: PROGRAMMING FOR DESIGN.

When a number of unique and special facilities have to be constructed over a period of time, and when such construction must add to the total design effect, it is desirable to establish a set of instructions for the architect which clearly indicates the function of any one building in the total plan and the design controls which must be respected in the architecture of the building.

Function includes such matters as the types and sizes of various interior spaces and their relationship to each other; the arrangement of interior and exterior circulation and services; utility requirements; limits on cost of construction, and other items relating to the programmatic aspects of a project which is being described in preliminary terms for the first time.

Design controls are such matters as site position, building heights, massing, selection of materials, site orientation and other aspects of the three-dimensional design. Programming for design makes it easier for the architect to grasp the purpose of the building and its general and special requirements. It brings to the architect the educational philosophy of the institution and the objectives which the building will attempt to meet. It establishes immediate rapport between the institution and the professional, smoothing the way for a successful solution.

This phase of campus planning and design enables the institution to state its program in definitive terms and reduces the need for endless conferences and discussions during the preliminary design of a building. The program, when well done, gives positive direction to the architect, and at the same time, allows the institution to explore alternatives to various solutions without being committed to a single solution.

PHASE 3: PROJECT EXECUTION.

Since an architect is selected because of his competency and experience with a particular building type, the program for any particular project should not be firmed until the architect has had a chance to review it and comment on it.

Projects which are to be executed typically are handled in six stages, the first (architectural programming) of which has already been mentioned. The others are:

STAGE 2: Preliminary design. The translation of the program into a design and would include, for example in a building project, floor plans and elevations.

STAGE 3: Final design. After the review of the first scheme, further refinements would be made and agreement reached on the scheme.

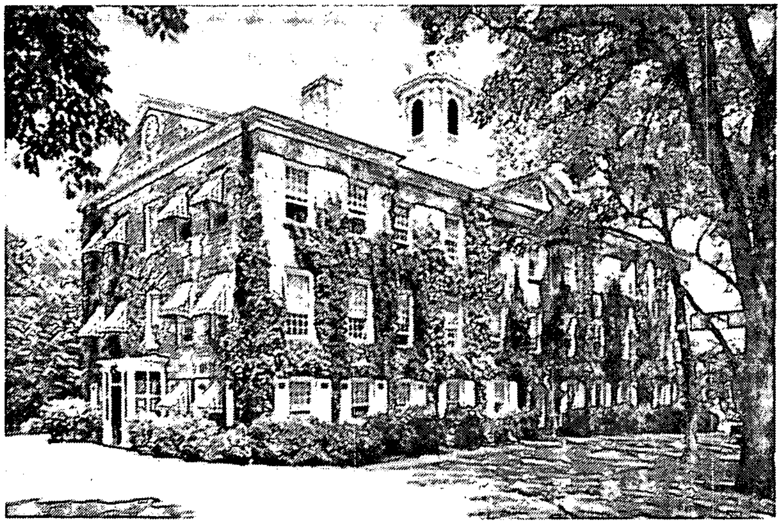
STAGE 4: Working drawings and specifications.

STAGE 5: Building.

STAGE 6: Supervision of construction.

PHASE 4: PROJECT EVALUATION.

The completion of any project affords an excellent opportunity to evaluate the program and design concepts. There is much to be learned from an executed building: types of equipment that serve well, methods of construction, procedures, cost estimates and other information. This hard-earned experience should be fed back into the process at all levels of planning and design, and should be a mandatory step in the planning process. By consciously using this body of information, the succeeding projects can be that much better.



1

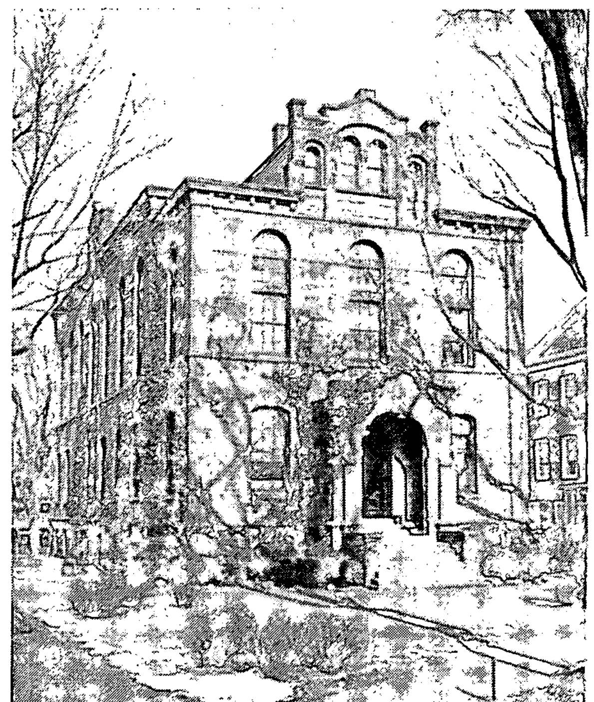
2

1
Old Queens (1809)
Rutgers University's first permanent building. It once sheltered the entire faculty, student body, chapel, and classrooms. A three story building (117 feet by 50 feet), it contained nine recitation rooms and a drafting room.

2
Van Nest (1845)
A three story building (52 feet by 62 feet), it served as the first building for science. Two large lecture rooms and storage halls were on the first floor; and on the other floors, a laboratory, chemistry lecture hall, and natural science museum.

3
Geological Hall (1873)
Two stories (45 feet by 105 feet), when first opened it had an armory, assaying room and workshops in the basement; reception hall, chemistry lecture room, store rooms for chemicals and a balance room on the first floor; and on the second floor, "The Museum—a splendid hall 90 feet by 40 feet with a lofty ceiling and a gallery extending around it."

4
Engineering Complex (1962)
$5.5 million engineering center now under construction for the New Brunswick campus of Rutgers University. Project as it appeared in late 1962. Architects: Frank Grad and Sons.
Rutgers News Bureau



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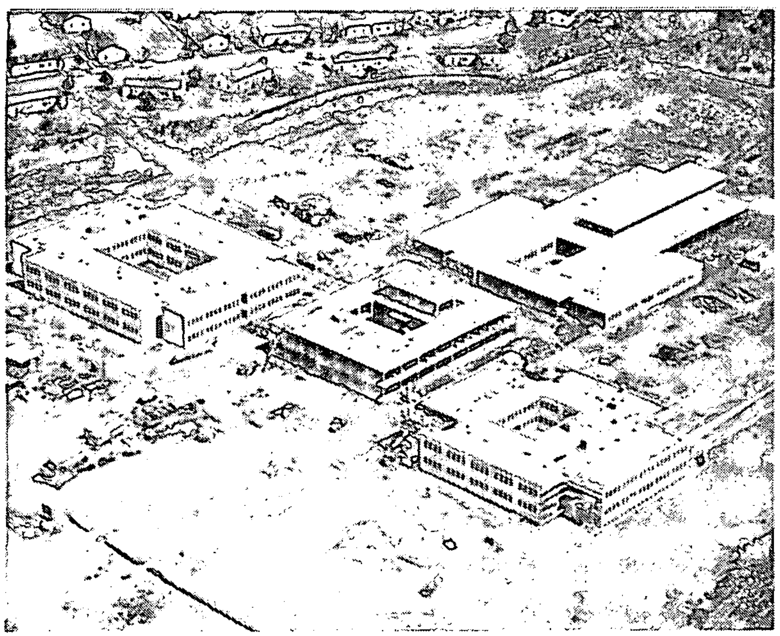


4

2. Instructional Facilities

BACKGROUND

The teaching-learning process may be independent of building, time clock, season, status and curriculum. However, that portion locked into the institutionalized sequence of regulated instruction, and accordingly measured and quantified, can be termed scheduled instruction. About thirty per cent of the buildings on campus today are devoted to the function of scheduled instruction—of transmitting knowledge in formal surroundings.

Architectural expressions of instructional facilities to the time of the Civil War were no more than an enlargement of the Little Red Schoolhouse. The best of the early buildings, while "too gorgeous for a wilderness," were "too mean for a college," due to a lack of money and a scarcity of workmen. The size of the college enterprise was, as it always has been, a factor of what could be done.

Princeton's faculty, for example, around 1820, consisted of a professor and two tutors, and there were less than eighty students. A building or two sufficed for most of the early colleges. Their furnishings were primitive. A distinguished graduate of Yale, 1857, looking back at the end of his century, wrote, "The freshman recitation rooms were furnished with three rows of benches, were lighted with oil lamps, were occupied by a needy student as his rooms when not used by a class for recitation, and were cheerless and uncomfortable."[1]

Three buildings at Rutgers are illustrative of the changes that occurred in the architecture of instructional facilities through the first three quarters of the 19th century. Not especially significant except as models of their time, the Rutgers buildings show in their evolution three stages of growth in higher education: essential needs, expansion, and refinement. The first buildings were basically a collection of simple rooms; diversification began with the construction of individual buildings to accommodate new subject matter; finally, there was a period of aggrandizement in both exterior and interior.

Requirements for teaching science, particularly chemistry, set the pace in the begin-

ning for changes in design—not that science was so quickly accepted into the curriculum and architecture adjusted accordingly. Professor Josiah P. Cooke at Harvard paid from his own pocket for renovation and equipment necessary to conduct his experiments and lectures. The first specially built laboratory was constructed at Yale (1824) for Cooke's contemporary, Benjamin Silliman. Located fifteen feet below ground level, the dank and dark room was entered by means of a ladder. A friend of Silliman commented: *". . . such a construction was not the result of Professor Silliman's wisdom. The architect, who was not without reputation in his profession, apparently had some vague impression that chemistry was a branch of alchemy, and that its black arts and explosions deserved a subterranean room."*[2]

In a utilitarian way the unknown architect was correct in his judgment about the longevity of college buildings and the factor of safety. Many pre-Civil War structures that didn't burn down, or fall down, have since been replaced by more durable buildings. Those which have managed to survive in their original dimensions are now generally used for some purpose other than instruction.

The great leap forward in the architecture of instructional buildings occurred in response to the enlargement of educational opportunities under the Morrill Acts and in connection with the spread of the university system. Departmentalization and specialization required a corresponding variety in room sizes, each having different seating capacities, equipment and fixtures. Accommodations for the engineering and the mechanical arts made it necessary to design for heavy loads, high ceilings, and longer spans. By 1870 there were enough students on some campuses pursuing a related sequence of courses to warrant a single structure devoted to one branch of learning.

Unusual beneficence cannot be overlooked as a factor that eventually made possible larger and more complex buildings. With less than $20,000 in permanent funds and going deeper into debt each year from 1825 to 1835, Yale was able, as a result of gifts, to replace in 1860 a simple white structure with the "five great buildings" which formed Sheffield Scientific School. In 1866 A. R. Green presented the Yale Corporation with a building for the fine arts which "he had erected at an expense of about $200,000."[3] In the same year George Peabody gave $150,000 for a museum of natural history, and about the same time the Lawrence Scientific School was put up at Harvard. These sums of money produced architecture improved both in capacity and utility, in sharp contrast to the $10,000 to $20,000 buildings of the decades prior to 1860. Unfortunately, some of the ostentatious memorials were bloated beyond all reasonable proportions by poor taste—a state of mind that Daniel C. Gilman recognized in his hopeful appeal for better architecture in his inauguration address as President of Johns Hopkins (1867).

Gilman pleaded:

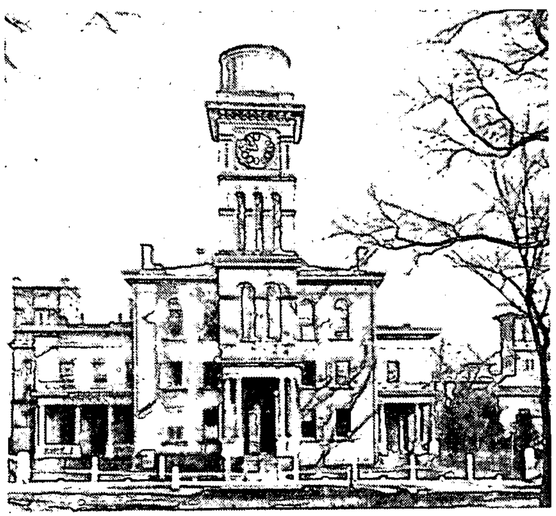
"Although it will take time to develop the plans, I hope that we shall all live to see the day when the simplicity, the timeliness, and the strength which characterized our founder's gift will be also apparent in the structures which his trustees erect; and when that site, beautiful in itself and already well planted, may be, in fact, an academic grove, with temples of learning so appropriate, so true, and so well built that no ornament will be essential for beauty, and yet that in their neighborhood no work of art will be out of place."[4]

Gilman had no luck with his trustees, and at Johns Hopkins and most other campuses, three dimensional bravado ruled the day. Inwardly, diversity and specialization shaped the buildings—a relevancy recognized quite early in the literature of 20th century campus architecture, but not universally believed to have an effect at that time on idiomatic interpretations of architectural style.

In the *Architectural Forum* (December, 1925), James W. O'Connor noted that "greater architectural intelligence" was being used in the design of instructional facilities: "the requirements of a given building are duly listed and given their relative importance." The architecture illustrated was Collegiate Gothic and Neo-Georgian; fashion ran counter to function; the buildings are no longer serviceable. As Horatio Greenough predicted in the previous century: "one of the surest symptoms of the decline was the adoption of admired forms and models for purposes not contemplated in their invention."[5]

"It is an anachronism," Walter Gropius wrote in the *New York Times Magazine* (1949), "to express the physical functions with the newest technical means but to express the spiritual functions by borrowing a historical shell from the past. Such an attempt confuses the art of architecture with applied archeology."

Only in the last several years has the inevitable evolution of campus archeology to campus architecture taken place. In 1962, William and Mary College (a bastion of Neo-Georgian that suffered badly with poor buildings in the last decade), Princeton University, the University of Massachusetts and the University of Colorado were about to build in the contemporary manner. Considering the 12,000 buildings constructed on campus between 1950 and 1962, at best it can only be said that colleges and universities were just catching up with advances made in elementary and high school architecture.



5
Sheffield Scientific School, Yale University
PHOTO: YALE UNIVERSITY NEWS BUREAU

PROSPECTS

Before suggesting techniques for programming instructional facilities and establishing planning modules, the conditions that may affect the design of campus buildings should be summarized. Three trends stand out: greater reliance on the individual to teach himself; the introduction of mechanical aids into the teaching process; and the design of multiple-function buildings, rather than a classroom or laboratory building specially constructed for one branch of learning.

The language laboratory is typical of how the traditional trinity of textbook, teacher and classroom has been extended by self-learning devices. In the language laboratory "instruction" is carried on seven days a week with monitored tapes providing playback exercises in pronunciation. Self-learning facilities may be compared to libraries in that their use is casual rather than scheduled, and they require a central location for optimum utilization. (And is the day far off when a student can dial for the lecture he missed, or hear again a critical summary from the instructor?) Closed circuit television and mechanical rote-learning devices are beginning to shape buildings, curricula and teaching methods.

Whether or not there is a sudden revolution in mechanical methods of instruction, the present evolution in varieties of interior spaces will continue. The following "mix" may come to be a common pattern on all campuses.

a. *Self-study alcoves* — More self-study spaces will be constructed. These may be located in the library, or special study buildings, or built into the dormitories.

b. *Seminar rooms*—The number of seminar rooms will increase, particularly if "team" teaching methods are adopted. With large sections meeting for lectures, and subdividing for discussion, recitation, and deliberation, the economies of large classes are combined with the advantages of smaller group meetings.

c. *Interchangeable classrooms*—Banks of rooms may be set aside for recitation and discussion in subjects which have no specialized equipment requirements. These rooms will have various seating capacities. Flexible partitions of high acoustical quality will allow large rooms to be changed easily to small.

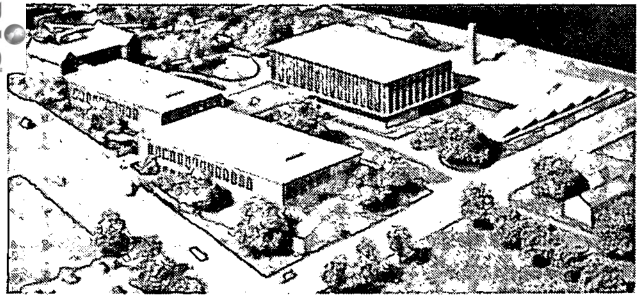
d. *Lecture-demonstration rooms* — These are similar to the interchangeable classrooms but are set up for demonstration purposes.

e. *Special-purpose classroom-laboratories* —These facilities will combine space for instruction, recitation, demonstration, and laboratory work in specific fields of knowledge —chiefly those requiring specialized equipment and unique installations.

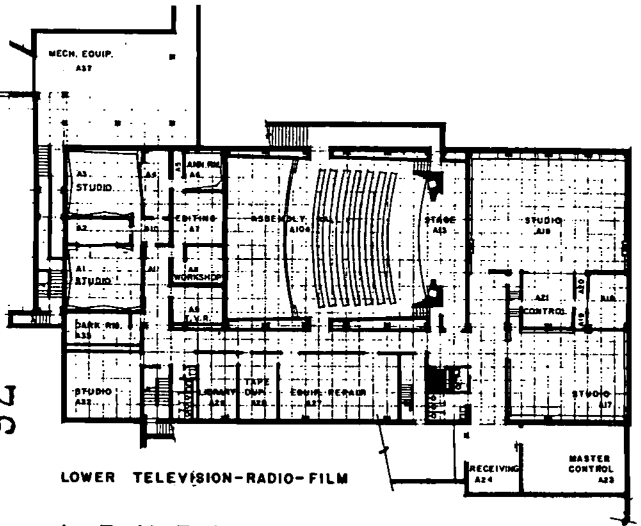
f. *Multi-purpose classroom laboratories*— These are similar to the laboratories above, but because of simpler interior equipment requirements can be used for several different subject areas interchangeably.

g. *Special teaching laboratories*—Such spaces as art and music studios are in this category, as well as special-purpose spaces such as graduate student laboratories and home economics laboratories.

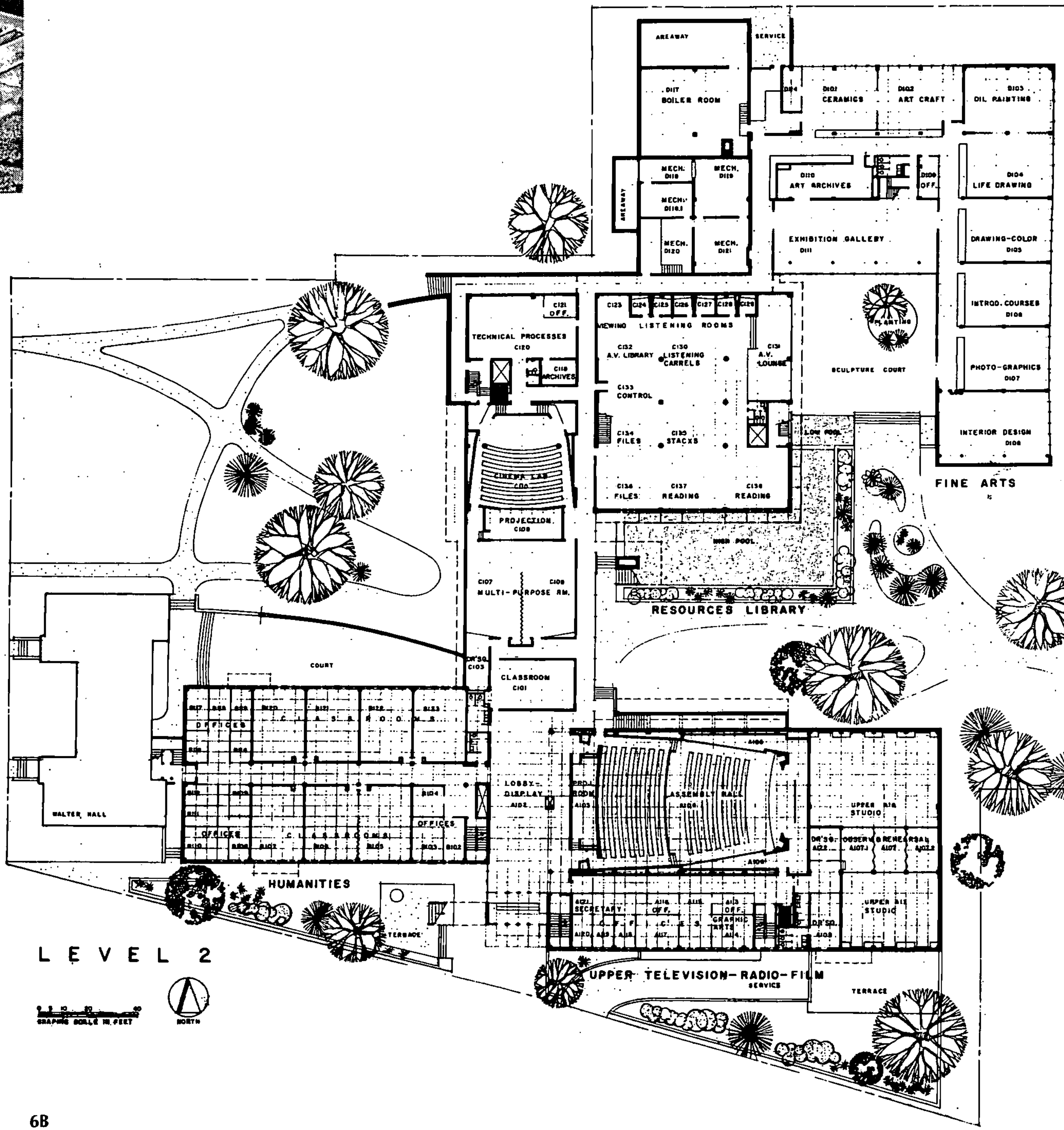
To accommodate the variety of spaces and emerging educational practices buildings are getting larger. This trend has evolved partly to ensure a maximum amount of space per dollar invested in stairwells, elevators, utilities, and corridors; and partly because the separation of areas of knowledge into many small departments—each with its own building—is being superseded by the assemblage of many disciplines into one specially designed center of learning. This center may be a single building or a group of buildings.



6A



L E V E L 1



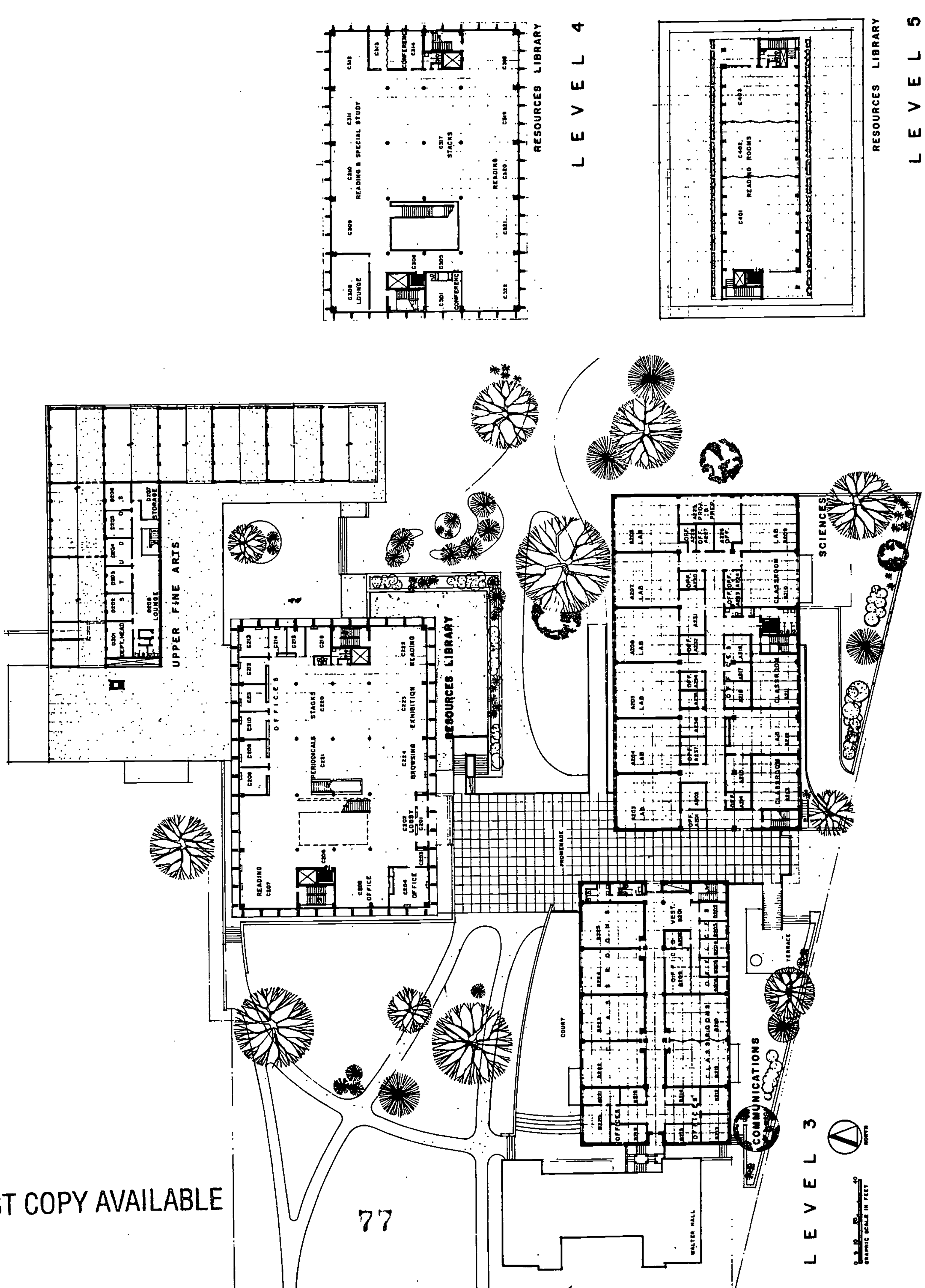
L E V E L 2

6B

6
James M. Wood Learning Center, Stephens College
Columbia, Missouri
Private
Women
Spring 1962 enrollment: 1699
Square footage: 124.455
Construction cost: $2,822,000
Architects: Murphy and Mackey (1962)

This is a skillful solution to the problem of bringing related together all subjects under one roof. The project, now under construction, typifies the trend towards wider variety in teaching space in higher education, the flexibility of room arrangements, the introduction of electronic teaching devices, and the use of the library as the crossroads in the citadel of learning.

6A
Site plan and model;
6B
Floor plans



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Engineering Sciences Center (1962), University of Colorado
Boulder, Colorado
Architects: William Muchow Associates; Hobart D. Wagner & Associates; Fisher & Davis; Architectural Associates of Colorado.

Design Consultants: Pietro Belluschi and Sasaki, Walker & Associates, Inc.

Site Planners & Landscape Architects: Sasaki, Walker & Associates, Inc.

7A
East Elevation

The design traditions of the University of Colorado campus were established by Charles Z. Klauder early in the century, and reflect Klauder's selection of a southern Italianate pallatte of native sandstone and red-tile roofs, as well as the organization of separate buildings around courtyards and malls.

Generally, the program requirements for a building as large as the Engineering Sciences Center, and the scarcity of land as well as the desirability of compactness would lead to a high-density, single-building solution. Since such a building would be out of scale with the existing campus, particularly with a nearby dormitory grouping, the total mass of the building was broken down by program elements and then expressed as towers or wings. The grouping of these various units around interior courtyards, and in turn the siting of the complex so as to properly orient it to campus-wide circulation, were also part of the design solution. Color of materials and massing serve as design themes melding old and new.

Each department has its own laboratory unit, classrooms, faculty and administrative offices. Common facilities shared by all are also expressed architecturally as recognizable sub-elements of the design. Interior courts encourage and support circulation within the complex, as well as tying into points of entrance and exit to the exterior.

Because of the Boulder climate, extreme sunlight limited the use of glass. The building is air-conditioned throughout. Where fenestration is required for work areas, and offices, the openings are shielded by precast concrete hoods. The hoods soften the massive lengths of unbroken wall area.

Spectacular scientific and technological advances of the last two decades have brought enormous changes in the character of the engineering profession. New engineering disciplines have been created—nuclear engineering and space technology, for example. Existing disciplines have undergone changes in emphasis. The application of the computing sciences, discovery of new fuels, new materials, new structural principles, is further evidence of explosive growth in subject matter. The engineer has become a creative scientist, bridging the gap between basic sciences and applied technology. To meet these demands, the education of the engineer is being recast, and new types of physical facilities appropriate to engineering education are being evolved.

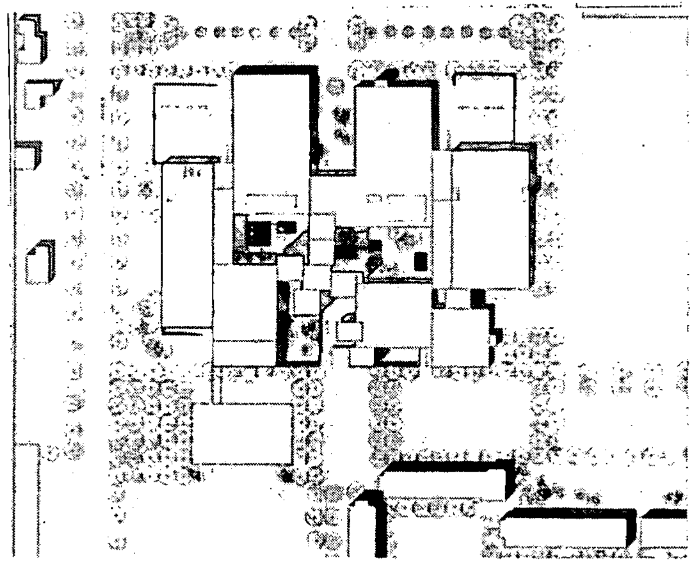
Because of anticipated increase in the need for engineering-trained graduates, plus the physical limitations of existing facilities which made it difficult to provide for expanded programs as well as enrollments, it was determined that a new facility be constructed on the Boulder campus.

The architectural program brought together the following departments, branches and research activities into the Center for Engineering Sciences.

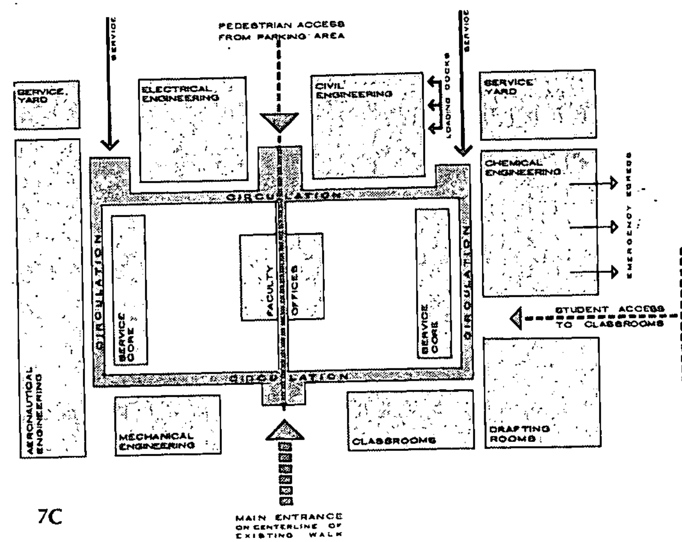
Aeronautical Engineering
Applied Mathematics
Chemical Engingering
Civil Engineering
Electrical Engineering
Engineering Graphics and Machine Design
Mechanical Engineering

Total space requirements were:
Teaching laboratories ....168,000 square feet
Research laboratories ....106,000 square feet
Office, classrooms
and support space ....150,000 square feet

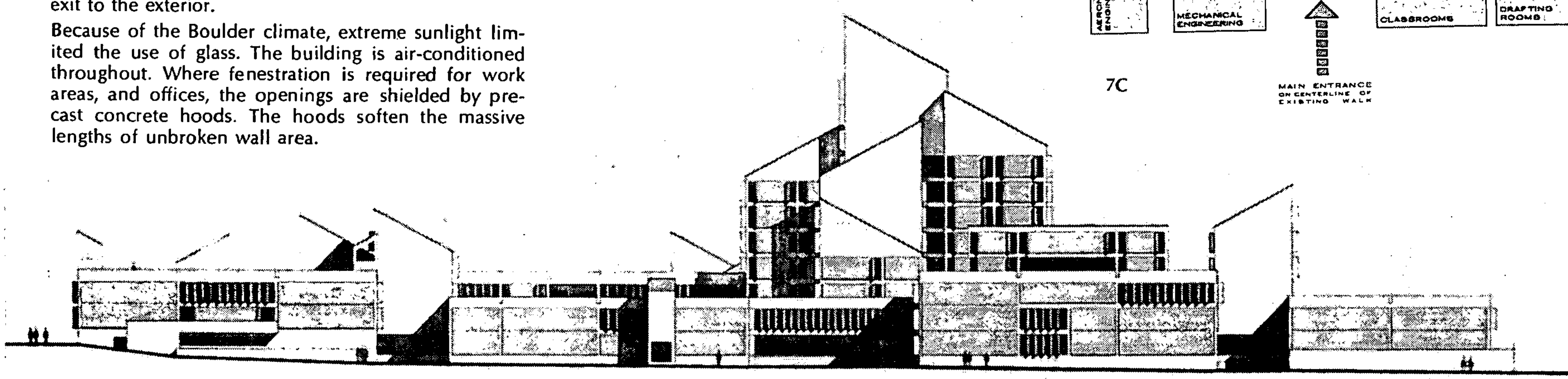
7B, C
Site of Engineering Sciences Center



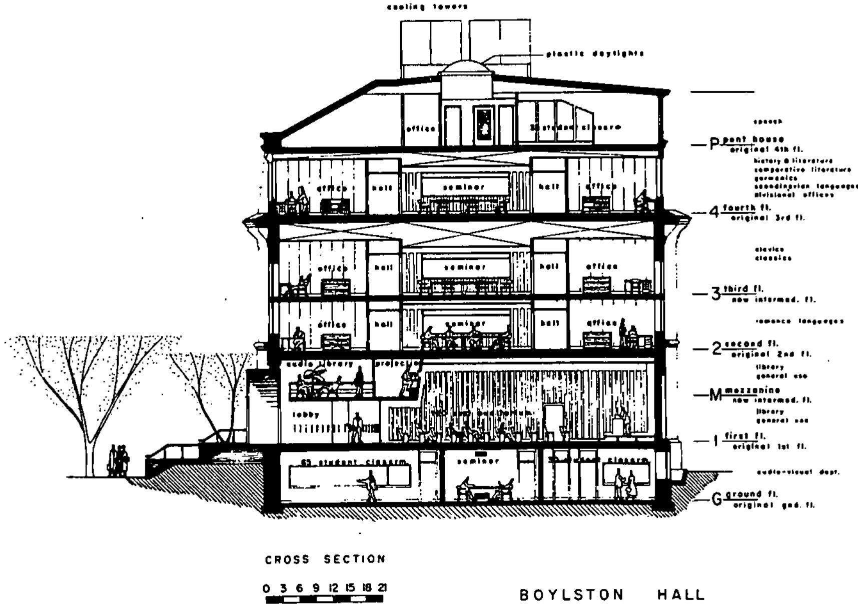
7B



7C



 7A



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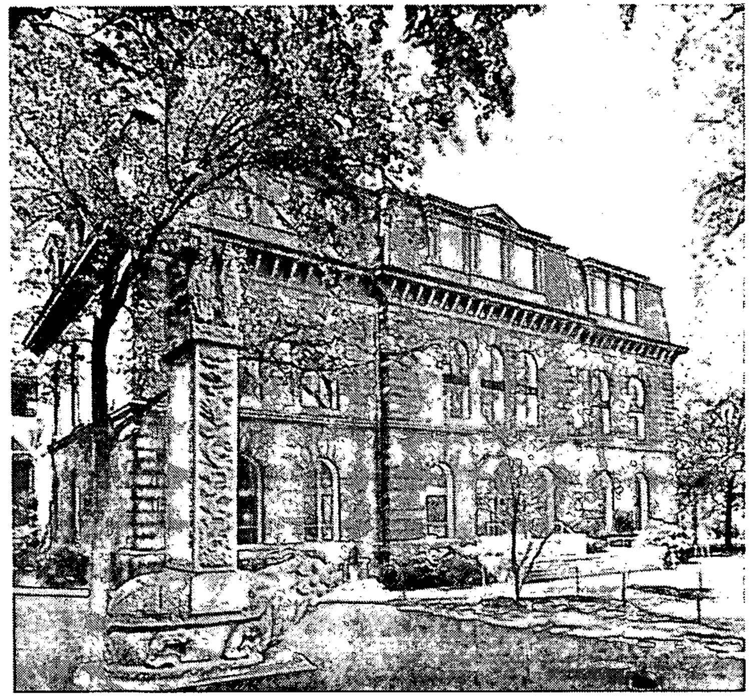

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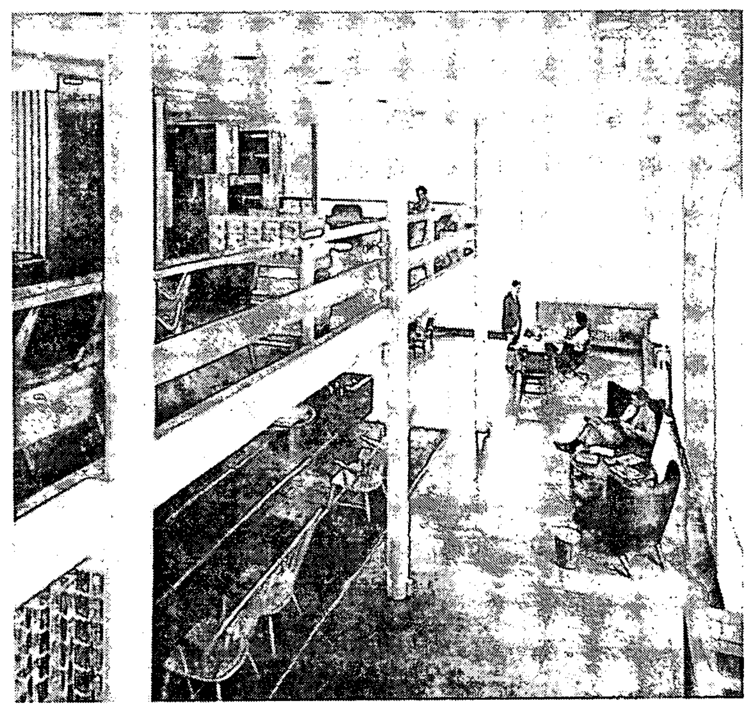


8C

8A, B, C,
Boylston Hall—Remodelling, Harvard University (1960)
The Architects Collaborative
Benjamin Thompson, Partner-in-charge
Built in 1857 and four times remodelled, Boylston Hall's latest transformation provides the special facilities needed for contemporary instruction methods in the Romance languages. Last sheltering the Harvard Yenching Institute, the building now serves as a language center; containing audio-tape library, lecture halls, classrooms, audio teaching booths, lounges, faculty offices, and meeting rooms for language clubs.

The renovations give evidence that contemporary design standards need not be compromised as new uses are fitted into old buildings. Good advantage was taken of the high ceiling rooms in the original structure by inserting a mezzanine over parts of the first floor, and inserting a complete floor between the original second and third levels. Over 14,000 square feet was added. New space and renovated old space cost $800,000—about $500,000 less than the estimated cost for a new building.

PHOTOS: LOUIS REENS

PROGRAMMING INSTRUCTIONAL FACILITIES FOR CAMPUS PLANNING

Problems and Needs

The institution of higher learning is remarkable for pursuing an intricate program with little agreement about fundamental purposes. Physical plant requirements cannot be planned until the purpose for which they are to be built has been articulated by those responsible for establishing educational goals. The first requisite for programming instructional facilities is the academic plan. The academic plan is both a map and a compass. It will outline curriculum, establish alignments between subject areas, and structure the administrative organization that binds the various disciplines together into a single entity, which is the institution itself. The academic plan is further described in Section III. It is mentioned here in order to place programming for physical plant in its proper perspective.

Prior to 1945 methods for estimating growth needs for instructional facilities were erratic, irregular, and occasionally irrational. Industrial management programming techniques were tried, but the bridge between the production of goods and the production of scholars could not be made. At Columbia University (1924) P. C. Packer originated a guide for estimating elementary school plant requirements, but his concepts were not linked to college and university problems until two decades later.

An educated guess by the President and Board of Trustees as to what the school could afford was a favorite informal approach. Another method calculated square footage per student by dividing the total space available by the number of students enrolled, and then projected that factor into the future. Projections such as these failed because they did not account for differences in space requirements by subject area or level of instruction. The square footage index was applied indiscriminately to both laboratory and classroom populations.

Planning procedures were as confused as projection methods, one observer noted:

"It was with the chaotic situation in 1948-49, that I started my work as building co-ordinator at this college. At the time, only one other college had adopted this idea of making one person responsible for all planning. At all the others, planning was done by a busy president or by the Lord only knows how many deans, chairmen, and even entire departmental faculties. The confusion, inefficiency, and waste can be imagined. Department fought department to get what each thought it needed. The aggressive got too much and the modest too little. When a given department wasted money, the whole college suffered. Individual fought individual. The belligerent dean got a suite of offices with a luxurious built-in wardrobe, while his timid colleague ended up with a single office so small that it was a moral hazard to any pretty secretary. It was every department and administrator for himself and the devil take the hindmost."[6]

These makeshift methods became untenable with the sudden institutional expansion following World War II. California, for example, in 1940 had 7,000 students enrolled in all its state colleges; in 1956 this enrollment had reached the 63,000 student level; in 1958, 80,000 students were enrolled, and a combined enrollment of 180,000 students in the state colleges has been predicted by 1975[7]. College and university administrators had to invent sophisticated planning techniques to keep track of the variables that the previous generation had been able to ignore. Public higher education had to plan ahead and guess how many people would be enrolled, or suffer political repercussions from the citizenry when suitable facilities were not available, particularly those institutions affected by the westward migration patterns and population increase.

In addition to estimating the number of students expected to enroll, the diversity and variety of facilities for teaching and research in science and technology required new insights in space programming. Rising costs impelled fuller utilization of buildings. As a result a number of significant programming studies were prepared in the 1950's for state universities in Minnesota, California, and Michigan. Each method improved on an earlier technique. Because higher education is in transition, and diversity among existing institutions is so great, there is no single system devised so far that has universal applicability. The accepted procedure is to set up a programming study for each private institution separately. Because of their administrative interrelationships, space standards may be set up for an entire state-wide system at one time, as was done in Colorado and Montana in 1962.

AN ABBREVIATED TECHNIQUE FOR PROGRAMMING INSTRUCTIONAL FACILITIES FOR CAMPUS PLANNING

The method outlined below is a short cut to be used when local standards cannot be formulated. It is based on several of the pioneer studies previously cited. Campus planners who wish to organize their own procedures may use the sources listed in the bibliography to this chapter to formulate a similar model.

As no method is free from some kind of subjective reckoning, the larger the number of variables that can be considered, the more reasonable the estimate. For physical planning purposes, the important information to get from program projections is:

1. Gross square footage required to support each subject area in which instruction will be given.
2. The time sequence in which these needs will appear during campus expansion.
3. The probable form which these programs will take—buildings, parts of buildings or outdoor spaces.

Steps in Programming

To set up a program for instructional and related facilities, four items must be identified.

a. Anticipated campus population per type of activity
b. Establishment of stages of growth
c. Space standard per type of activity
d. Policy on utilization of facilities

STEP 1. PROJECTING CAMPUS POPULATION

As described in Section III, the campus population may be determined by:

a. a demographic projection deduced from past enrollment trends.
b. an enrollment figure assumed because of policy decisions to recruit or limit enrollments to a certain figure at a pre-determined date.
c. an enrollment figure fixed independent of any given date or projection.

The third situation is the easiest figure to set.

Because campuses grow by logical building increments, arrange the stages of growth so there is a reasonable interval between each planning period. Otherwise, planning modules will be so fractionalized that the staging plan will be unrealistic. Growth figures will suggest the pace of activity and the size of the school. Assuming a progressive and even pattern of expansion, institutions with enrollments of over 10,000 students should establish stages of growth in multiples of 2,000 students; institutions between 5,000 and 10,000 students should plan in increments of 1,000 students; institutions less than 5,000 but more than 1,000 can use stages of 500 students, while institutions smaller than 1,000 students can advance in terms of 200 students at each planning stage. These figures are F.T.E. and refer only to physical planning stages. F.T.E. is Full Time Equivalent students as opposed to head count which might include part time students.

Stages of growth in a small institution would be expressed thusly:

800	student plan F.T.E.
1000	student plan F.T.E.
1200	student plan F.T.E.

All calculations and projections would be tabulated accordingly.

STEP. 2. ESTABLISHING F. T. E. (SL) INDEX RATIOS THROUGH DISTRIBUTION OF STUDENT POPULATION BY SUBJECT FIELD, LEVELS OF INSTRUCTION AND F. T. E.

Teaching spaces vary by level of instruction and subject field. Anticipated enrollments have to be broken down to give appropriate distinctions between classroom and laboratory and other space needs by distributing the anticipated population by level of instruction and subject fields.

The distribution can be made on a ratio deduced from historic data. Generally, the enrollment "mix" will be stable or at least evolutionary. The proportion of students at each level of instruction is likely to remain constant. For example, an institution having an enrollment distributed:

50%	lower division
40%	upper division
10%	graduate division

is liable to maintain that ratio as it expands, or the percentage figures can be adjusted by policy decision or administrative review.

Within each subject area, the number of course credit hours given over a long period of time will tend to be equal. Not all courses are given every year, so the distribution will fluctuate from year to year. A subject field such as French with the course credit hours distributed

600	lower division (66%)
200	upper division (23%)
100	graduate division (11%)

is likely to also continue that pattern as an average over a number of years, or change according to adjustments made in projections of level of instruction.

To determine an index ratio for distributing student population, begin by listing all student course hours for the last five years by level of instruction and subject field and establish an average year load.

For example:

1957 English upper division courses	60 hours
1958 English upper division courses	45 hours
1959 English upper division courses	70 hours
1960 English upper division courses	60 hours
1961 English upper division courses	70 hours
	Total: 305 hours

Per year average: 60 hours

Translate into F.T.E. (SL) by dividing the average year credit course hours by an average student course hour load per F.T.E. If the average student load per F.T.E. has changed during the period in which the historic data is being used, then adjust the figure accordingly. The resulting figure will be an expression of F.T.E. by subject field and level of instruction.

For example:

$$\frac{\text{60 hours F.T.E. English upper division}}{\text{15 hours average F.T.E.}} : \text{4 F.T.E. (SL)}$$

Divide F.T.E. (SL) into the total number of F.T.E. students per base year to establish the index ratio between subject field and level of instruction and the total F.T.E. enrollment. The base year is the average total F.T.E. per year in the years covered previously.

For example:

$$\frac{\text{800 F.T.E. base year}}{\text{4 F.T.E. (SL)}} : \text{.005 F.T.E. (SL) Index Ratio}$$

Calculate base ratios for all subject fields and levels of instruction. They should be judged as to their pertinency for future projections. The projection of the past into the future cannot account for the prospects of new programs, dynamic teachers, student preferences and external trends. All statistical ratios must be subjected to policy review and evaluation before being used as a projection base. Any adjustments made will have to be accounted for in the ratios assigned to other subject fields and levels of instruction. The mix in all subject fields and levels of instruction should total 100% in the average base year and 100% in the projection period. The ratios may be different in each stage of growth, but again, the total should be 100%. Any new programs will also compel an adjustment of the individual percentages in subject field and level of instruction.

The following is an example of a portion of a typical list of calculations at this stage of the programming, and reflecting a change in the chemistry department's activities:

F.T.E. (SL) Index Ratios, Subject Field and Level of Instruction

Biology	800-STUDENT PLAN	1200-STUDENT PLAN
Lower	.006	.006
Upper	.003	.003
Graduate	.002	.002
Chemistry		
Lower	.008	.008
Upper	.004	.006
Graduate	.002	.004

STEP 3. TRANSLATION OF F. T. E. (SL) INDEX RATIOS INTO F. T. E. (SLP)

F.T.E. (SLP) is the number of students anticipated in the planning period by subject field and level of instruction. The multiplication of numbers of F.T.E. (SLP) by a space standard gives the gross square feet of space required for each activity. To obtain F.T.E. (SLP) during the projection period, the total projection enrollment is multiplied by the Index Base Ratios derived in Step 2.

For example:

1000 students F.T.E. plan x .02 F.T.E. (SL) Index Ratio for graduate chemistry.

20 F.T.E. (SLP)

Make these calculations for each subject field and level of instruction and arrange in lists. The following is an example of a portion of such a list:

F.T.E. (SLP) Students by Subject Field and Level of Instruction per Plan Period

UPPER DIVISION	4000-STUDENT PLAN	8000-STUDENT PLAN
Anthropology	18	32
Archaeology	12	16
Biology	20	40
Botany	16	32

STEP 4. TRANSLATION OF F. T. E. (SLP) INTO NET SQUARE FOOTAGE INSTRUCTIONAL SPACE

Space standards for instructional facilities may be derived from an analysis of the institution's existing plant or established by standards especially set for each new building. If the former method is used, then the existing spaces must be thoroughly examined and evaluated as to their adequacy for the functions contained and space utilization.

The latter method is equally time-consuming. Detailed studies of both special and general instructional rooms, class size for each type of room and utilization policies will have to be made. This latter method will, however, yield excellent clues to the architecture of the building and identify significant differences in terms of assignable square footage figures. For example, the amount of square footage per student station (assignable) in classrooms will vary as much as four square feet per person, depending on the number of aisles in the room, rows of chairs, and numbers of seats. The bibliography lists manuals which discuss further space standards of this kind.

Our abbreviated technique uses space standards adapted from the 1955 publication, "A Restudy of the Needs of California in Higher Education." The figures represent seventeen public colleges and universities. Two basic types of facilities, three levels of instruction and eleven subject fields are included in Table 8.

These standards also include a highly-efficient utilization factor. For a forty-five hour operation, the space standards would allow classrooms to be used thirty-six hours a week at sixty-seven percent of theoretical capacity. Teaching laboratories can be used twenty-four hours a week at eighty percent of theoretical capacity. This is the maximum California administrators believe can be achieved without extending the school year and class schedule beyond desirable limits.

As the California program emphasizes structural quality, cost, safety, interior function and makes consistent attempts to differentiate between levels of instruction and sub-

Table 8: Planning Indices And Planning Standards

The table below can be used as a guide in checking programming figures as determined when using other methodologies, but is primarily intended for use with the abbreviated programming techniques described on pages 73 and 74. The subject area can be used as a planning index.

SQUARE FOOTAGE PLANNING STANDARDS PER F.T.E. STUDENT PER FACULTY MEMBER AND DEPARTMENT BY SUBJECT FIELD OF INSTRUCTION

	1		2		3		4		5		6
	LOWER DIV.		UPPER DIV.		GRAD. DIV.		RESEARCH ASSOC. WITH TEACHING		OFFICE SPACE		OTHER SPACE[f]
SUBJECT	CR[a]	TL[b]	CR	TL	CR	TL	GRAD.	FAC.[c]	ACAD.[d]	ADMIN.[e]	
Agriculture	7.1	41	7.2	63	1.7	100	200	300	150	60	10
Arts & Crafts	6.5	36	6.2	53	5.3	60	140	100	160	30	10
Engineering	5.4	95	7.5	96	2.3	—	200	300	180	60	15
Language & Lit.	11.9	—	9.5	—	9.5	—	30	40	140	30	5
Mathematics	9.6	—	9.5	—	9.5	15	30	60	140	30	5
Military Sci.[g]	12.0	—	12.0	—	—	—	—	40	140	100	15
Physical Ed.	12.0	—	80.0	—	—	—	—	100	140	100	5
Misc. Prof.	8.7	31	8.9	2	8.0	30	30	80	180	60	10
Bio. Sciences	6.6	30	7.2	38	1.8	60	160	250	130	50	10
Physical Sci.[h]	8.0	28	8.0	42	1.8	80	160	250	130	50	10
Social Sciences	9.5	3	9.2	2	8.4	15	40	40	140	30	10

Footnotes
a. CR—Classrooms
b. TL—Teaching laboratories
c. Faculty—Includes teaching assistants
d. Acad.—Office space for academic purposes by department or subject field, per faculty member
e. Admin.—Administration of subject field, not general administration
f. Other space—Includes shops, storage and miscellaneous. This is not gross square footage index, but a percentage of the total assignable space of Columns 1 to 5
g. Does not include outdoor drill fields
h. Does not include outdoor playfields

83

Campus extension centers and continuation facilities should be programmed separately. No useful projection figure has been found for these facilities, but an assumed standard can be arrived at in conference with the appropriate officials on campus.

ject area, these standards are acceptable as a conservative base for programming new facilities in a general plan. They are not adequate, however, for programming specific projects for purposes of preliminary architectural design.

To use the table of standards:

a. Organize the subject field list in Step 3 according to categories that best approximate the headings used in Table 8.

b. Multiply the F.T.E. (SLP) in each category by the level of instruction and subject field. Use both classroom and laboratory figures where appropriate.

This will give the total assignable square footage per activity. Add lower, upper and graduate spaces per subject field together. The result is the net square footage of required instructional space.

About ten percent of the total contact hours in scheduled instruction takes place in such facilities as physical education fields, auditorium, offices, drill fields and other spaces. In the abbreviated technique, this amount of construction is assumed to be provided in these facilities, and a ten percent reduction of all instructional spaces calculated in this step should be made.

STEP 5. ESTIMATING RELATED SPACE NEEDS

Research space associated with instruction, faculty office space and departmental space will usually be included in buildings devoted to a subject field. This space should be added to the instructional space requirements in the planning module. These spaces can also be listed independently of the subject field requirements if the campus policy dictates building banks of offices and graduate and faculty research space separate from other buildings.

If the planning module is to include research space associated with instruction, add space increments shown in Column 4, page 73. These are calculated on the basis of graduate students and faculty members.

To determine the number of faculty members, project the existing student-faculty ratio on a straight line basis and round the number off to the next highest number, or use this method.

a. Calculate total number of classes by level of instruction and subject area, using base years as a ratio for projection.
b. Establish teaching load per faculty member by number of classes to be taught.
c. Divide (a) by (b).

For example:

a. Language and literature total classes: 40.
b. Teaching loads per faculty: 4 classes.
c. Number of faculty: 10.

If planning modules are to include *departmental* academic and administrative office space, add space planning increments as shown in Column 5, page 75. Calculate these on a per faculty member basis.

For departmental or division or subject area shop, storage and miscellaneous space, add to the total space calculated from Columns 1 to 5, a percentage increase as listed in Column 6, page 75.

Divide total requirements, which represent assigned square footages, by 1.25 for gross square footage estimates for planning modules.

At this point, the gross square footages for each planning stage will have been identified as follows in each subject field and level of instruction:

F. T. E. students
Number of Faculty
Classrooms and laboratory space needs
Related space needs

STAGING

Based on the academic prospectus, label those spaces having an academic affinity. Spaces having similar architectural characteristics should also be identified. For example, those having similar floor-to-ceiling heights, utility requirements, acoustical needs and other similarities. This information will help give reasonable shape and form to the planning module, as well as aid in the staging of development.

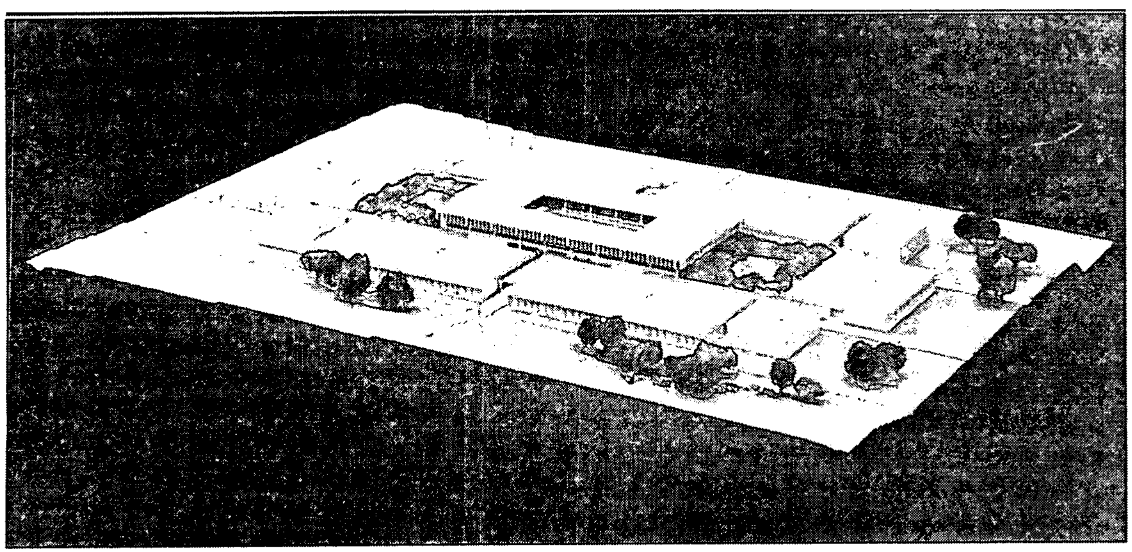
Staging is the assignment of existing space and new space so that subject fields can be adequately housed at each period of growth. As a general rule, the campus plan attempts to reduce the number of physical moves that each subject field must make in the course of obtaining its space requirements. Staging is difficult because an institution's growth is dynamic. Facilities must be built occasionally below capacity in anticipation of increased enrollments. Some subject fields must use makeshift quarters until new facilities can be constructed. The re-organization of subject fields into centers of learning upsets the traditional alignments between departments, and these conditions too must be reflected in the campus plan.

A testing of staging moves is one of the useful by-products of the planning module method of planning. Programs are not a substitute for planning, but the ways in which they are organized will facilitate the task. Lists of facilities should be summarized in tabular form, in preparation for making planning module decisions. The table should indicate the amount of space that is to continue in use during the period of the development plan, the amount of space that is to be significantly altered or removed from campus, and the amount of new space required above that which exists or is replaced.

The translation of tables into planning modules will be affected by design and other program factors. Requirements may be satisfied by renovating an older space, by adding a wing, by constructing a new building, or by constructing a group of buildings. These matters are extensively illustrated in Section III.

The steps described above can be adapted when organizing other kinds of planning modules. Unless otherwise noted, the techniques of calculating and tabulation will be similar, and this procedure will not be described again in the chapters that follow.

9
Academic Center, Diablo Valley College, California
Architects: John Carl Warnecke & Associates (1962)
Intended to gather all non-science teaching facilities into one area.



FOOTNOTES

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7. "The Cost Of Higher Education In California 1960-1975"; Technical Committee on Costs of Higher Education in California; The State Board of Education, Sacramento, California, 1960; p. 103.
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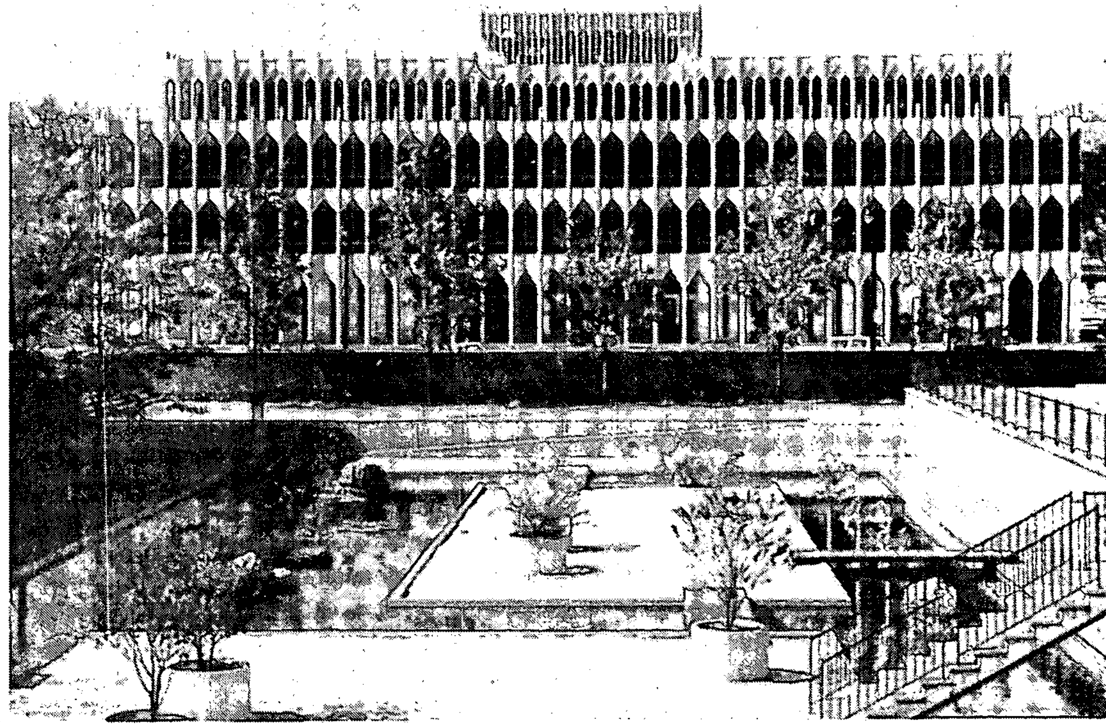
10A, B, C,
Education Building, Wayne State University (1959)
Detroit, Michigan
Architect: Minoru Yamasaki and Associates
The arrow indicates the position of this building, one of several designed by the architect as part of his long-range expansion plan for the University, as shown in the model photo. (See also page 108.) Classrooms and offices are located on the first three floors. The fourth floor is zoned for non-instructional uses, and serves as a center for the faculty and administrative activities. Though the building design was frankly experimental, construction bids came in at less than $20.00 a square foot, which was lower than brick and porcelain enamel buildings previously built on campus. The interesting facade consists of 120 structural precast reinforced concrete "trees," 40 feet high and 5 feet wide; between the "trees," fixed anodized aluminum sash.
PHOTO BY: BALTAZAR KORAB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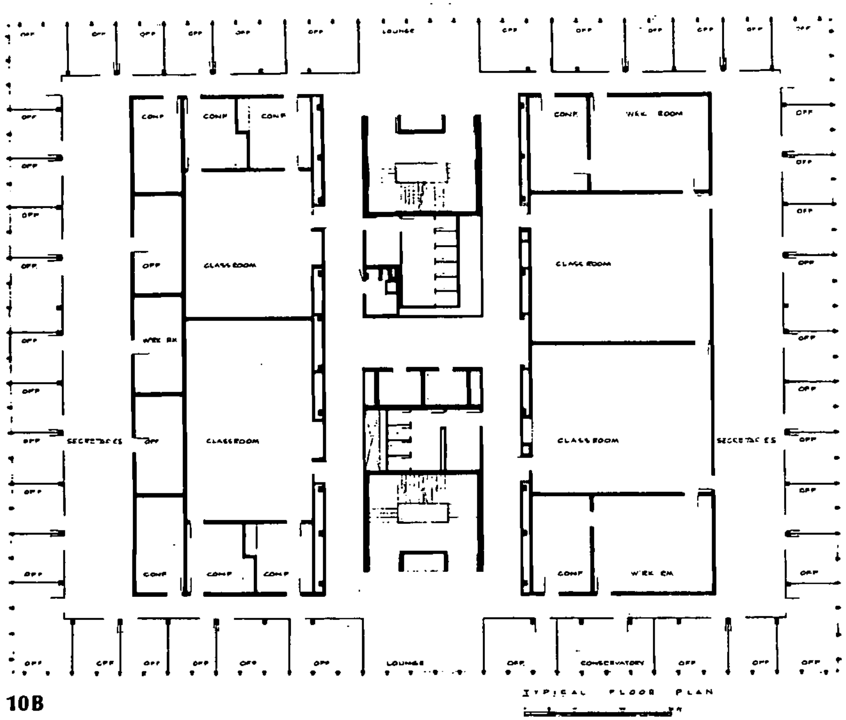

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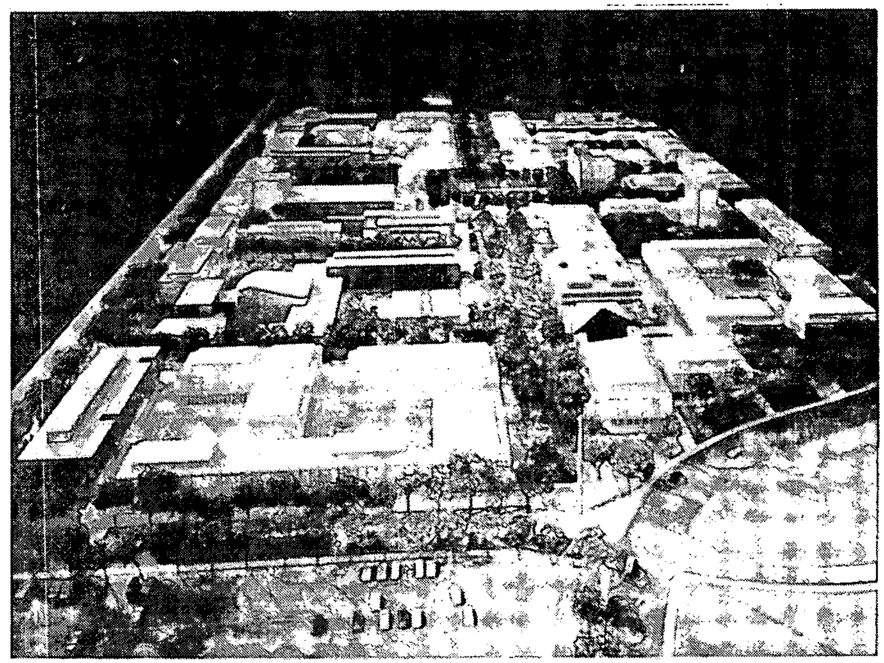
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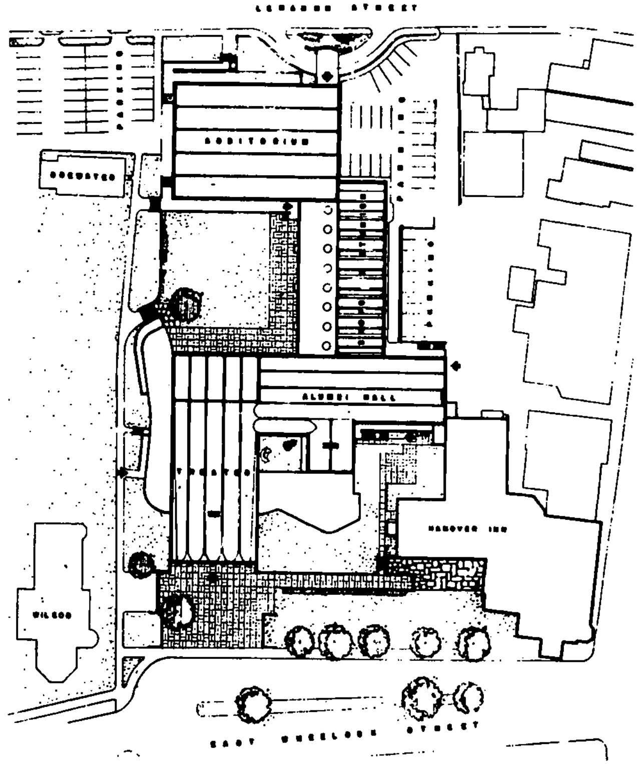

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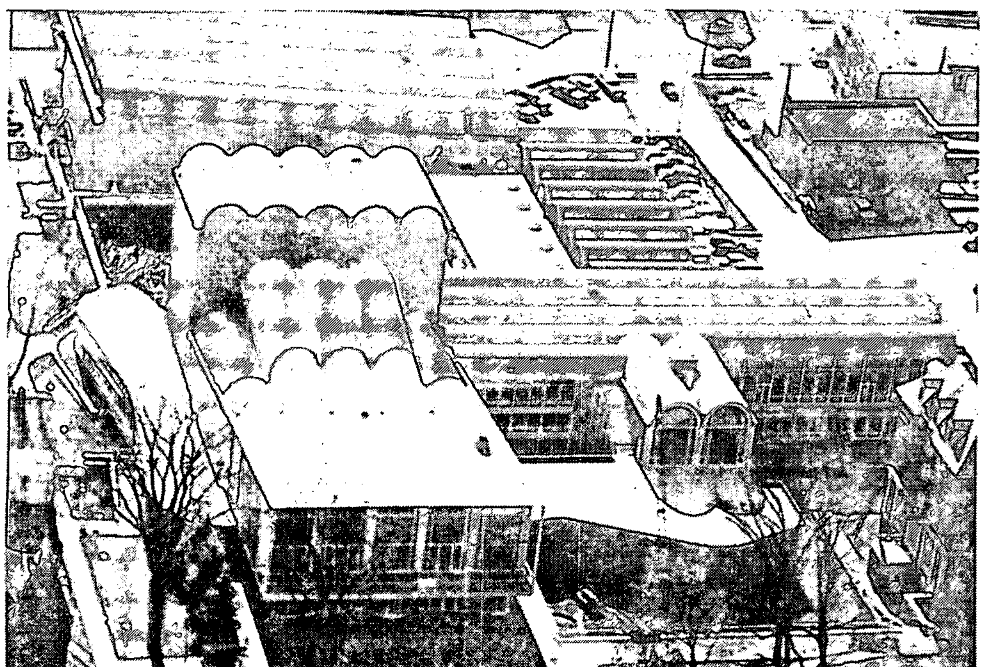


11B

11A, B

Hopkins Center, Dartmouth College (1962)

Harrison and Abramovitz, Architects

Located at a strategic crossroads on the Dartmouth campus, this center for the creative and performing arts places on a single site over seventy different facilities. The four acres of floor space are cleverly sited to fit into the existing scale of buildings on the campus. Half the facilities are below grade, while the above grade structures are sited so that the narrow end faces The Green, a major college open space. Intended to serve both classroom needs and extra-curricular functions, the seven million dollar complex operates on the "sidewalk superintendent" principle, exposing the entire College community to the daily work in the buildings, as well as exhibiting the finished efforts in the theatres, galleries and concert hall that comprises the center.

PHOTOS: DARTMOUTH COLLEGE NEWS SERVICE

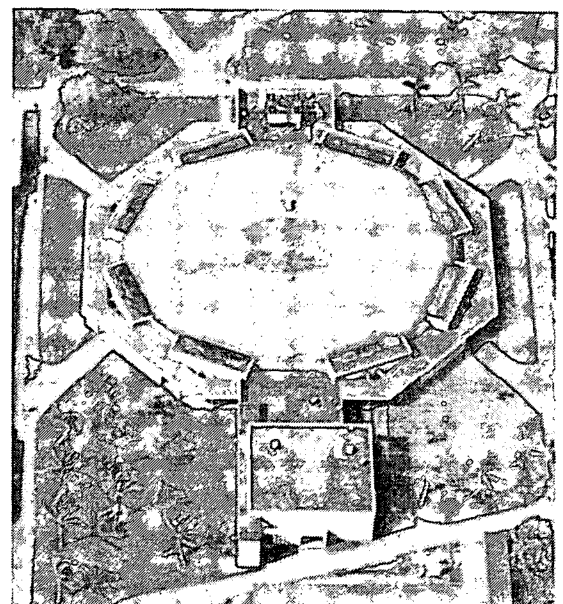
12

Lecture Hall, University of Miami (1961)

Coral Gables, Florida

Architect: Robert Fitch Smith

The structure contains eight pie-shaped classrooms converging on a central audio-visual projection room. The two rectangular rooms shown top and bottom of the octagon, contain repair shops for equipment, faculty offices, and preparation rooms for demonstrations. Central studio provides television and films to other buildings on campus. Each classroom contains seating for 300 students. Eight separate lecture-demonstrations can be carried on simultaneously; or, for example, at a freshman orientation program 2400 people can watch a single program through the closed circuit tv system.



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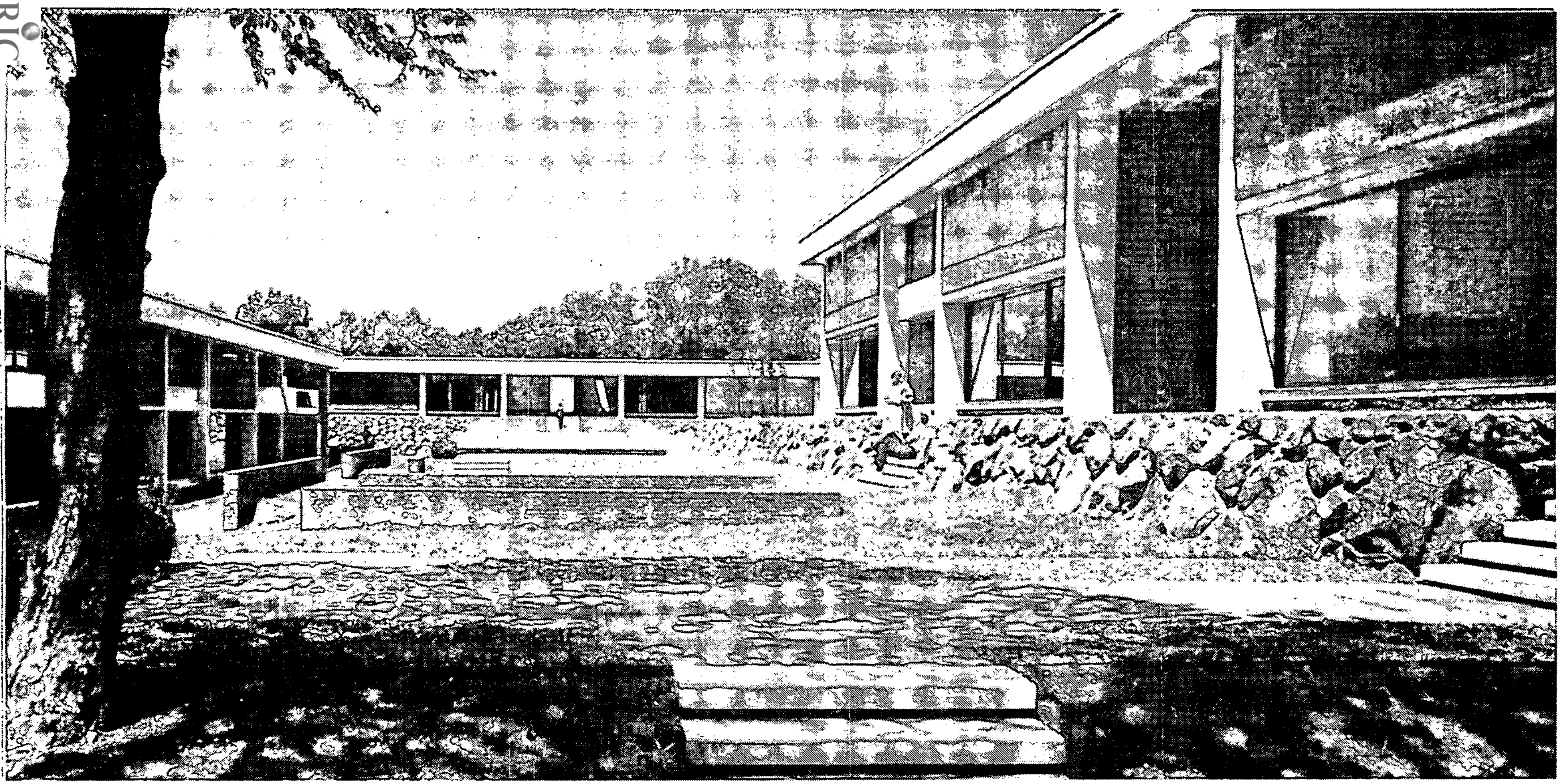

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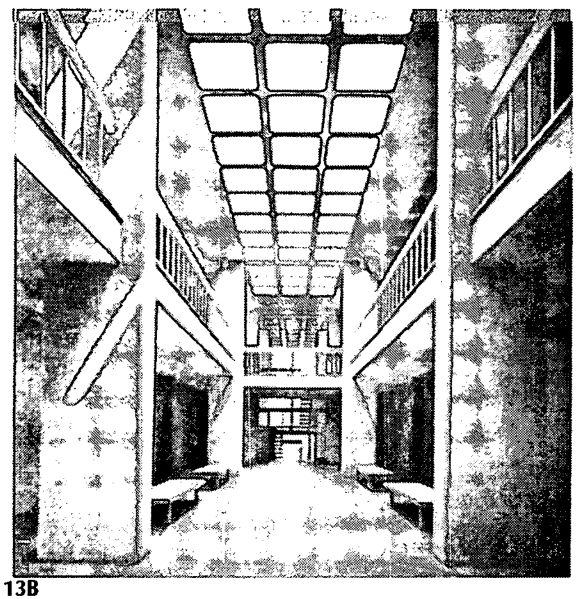

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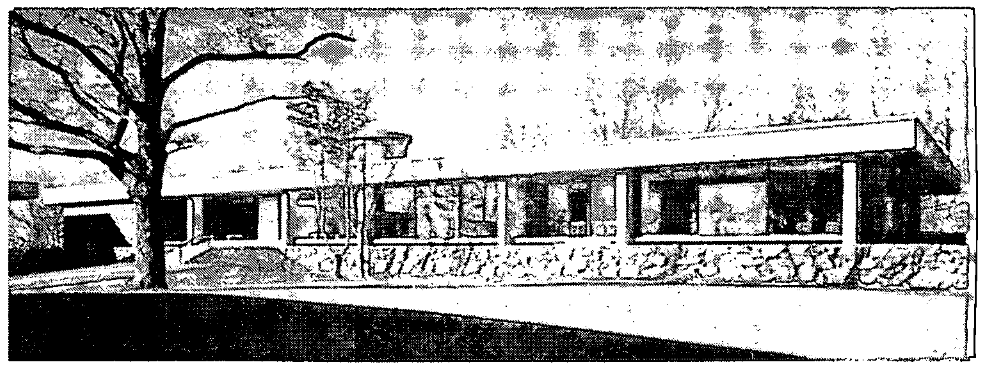
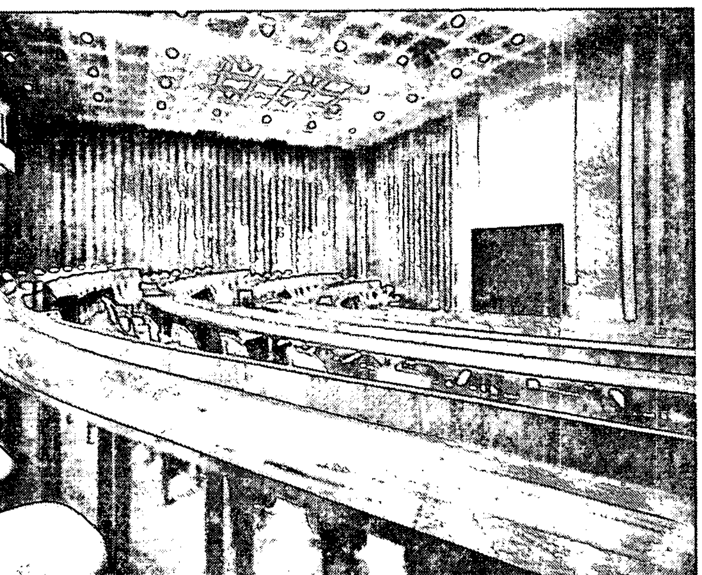


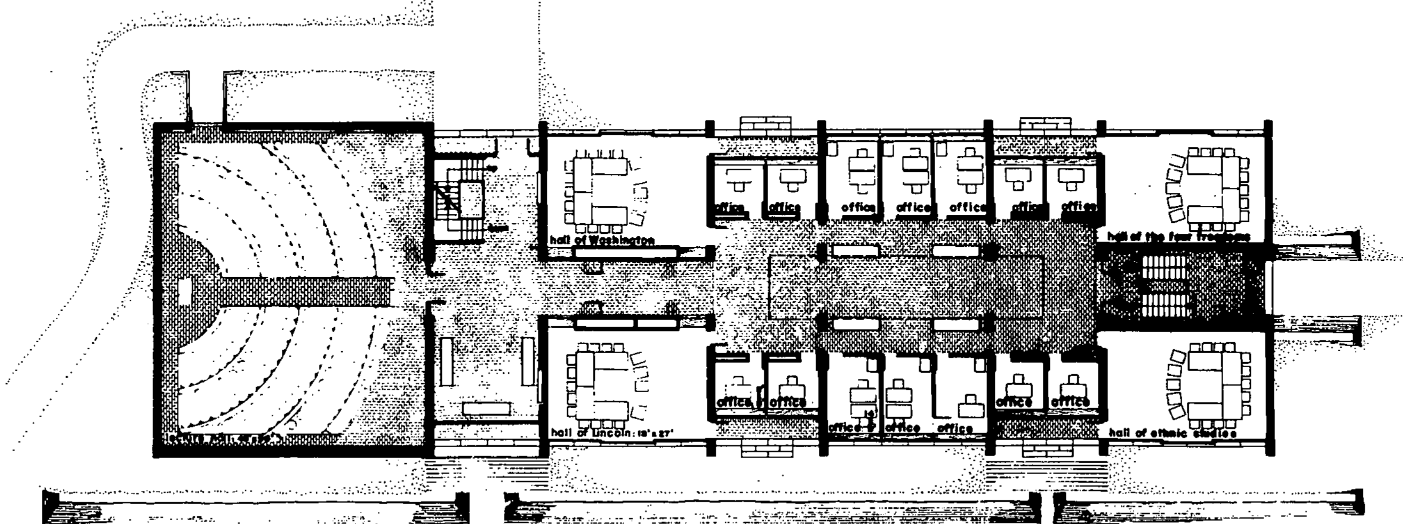
13C

88

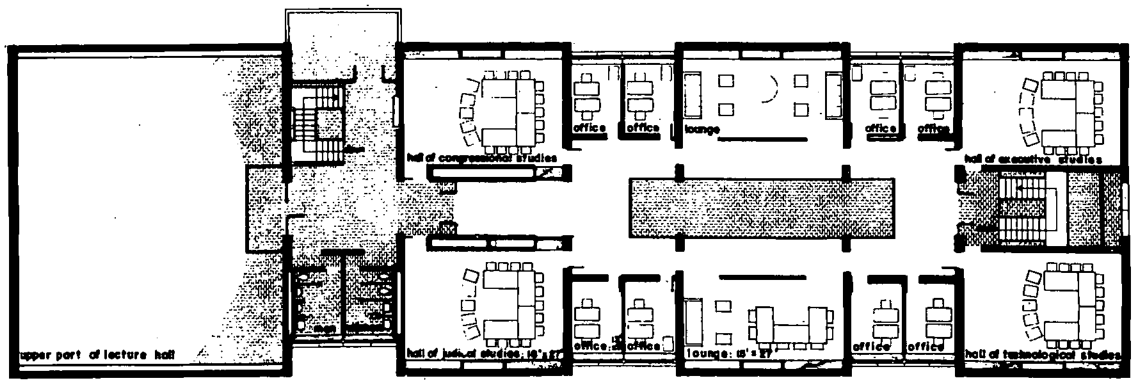
13
Academic quadrangle, Brandeis University (1960)
The Architects Collaborative
Benjamin Thompson, Partner-in-charge
Another variation on the theme: bringing together related subject areas into a center of learning. In accordance with the school's traditions, there are separate buildings for each donor.
PHOTO BY: LOUIS REENS
13A
View of quadrangle
Building to left: Olin-Sang
Building in center: Golding Judaic Center
Building to right: Shiffman Humanities Center
PHOTO BY: EZRA STOLLER
13B
Interior view: Olin-Sang
PHOTO BY: EZRA STOLLER
13C
Facade: Olin-Sang
PHOTO BY: LESTER S. LEVY
13D
Olin-Sang Lecture Hall
13E
Floor Plan: Olin-Sang



D

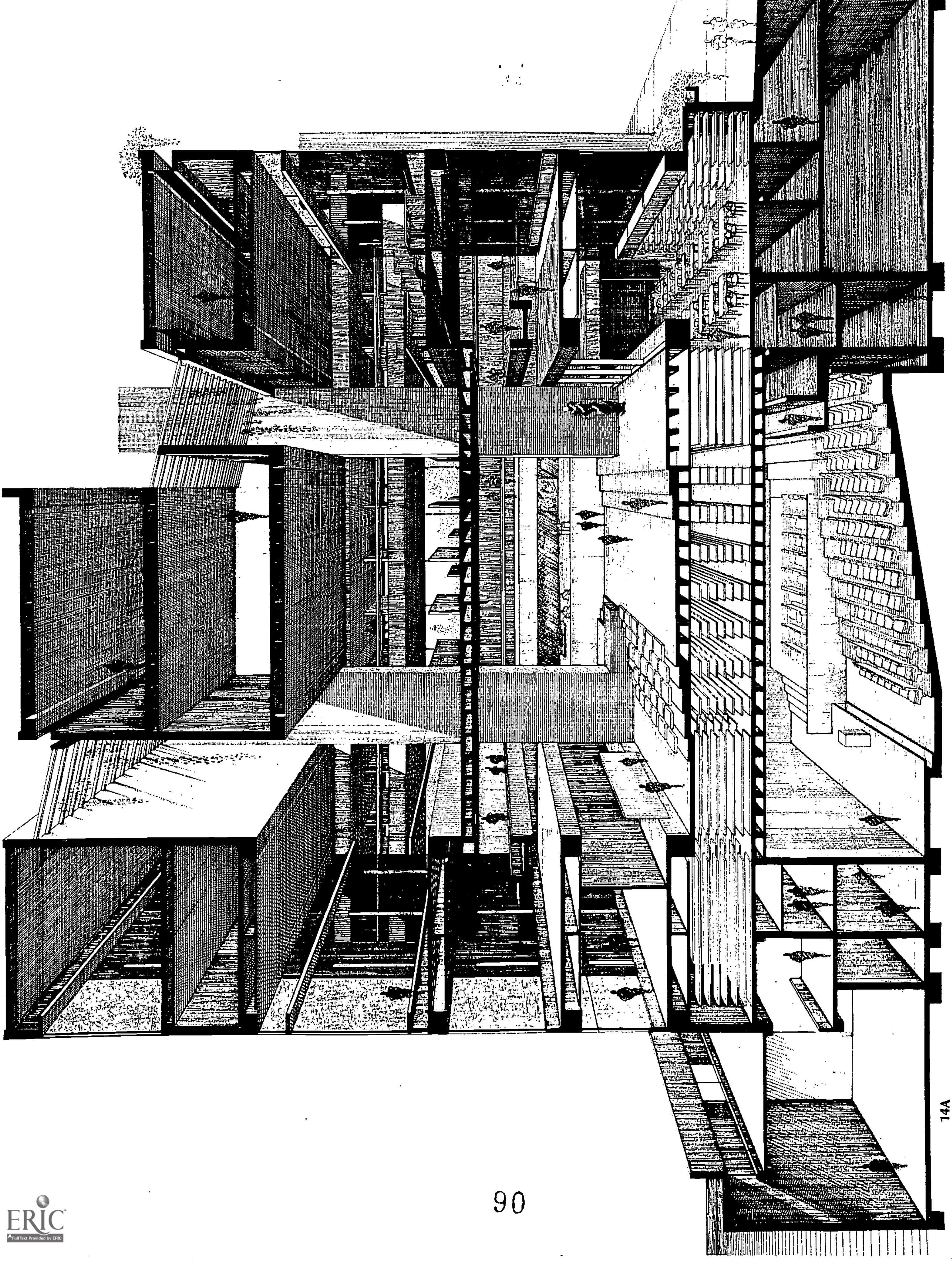


OLIN-SANG AMERICAN CIVILISATION CENTRE : FIRST FLOOR (Gross area: 10870 sq.) scale: 1/8": 1' ACADEMIC QUADRANGLE, BRANDEIS UNIVERSITY



OLIN-SANG AMERICAN CIVILISATION CENTRE : SECOND FLOOR (Gross area: 10990 sq.) scale: 1/8" : 1' ACADEMIC QUADRANGLE, BRANDEIS UNIVERSITY

13E



14A

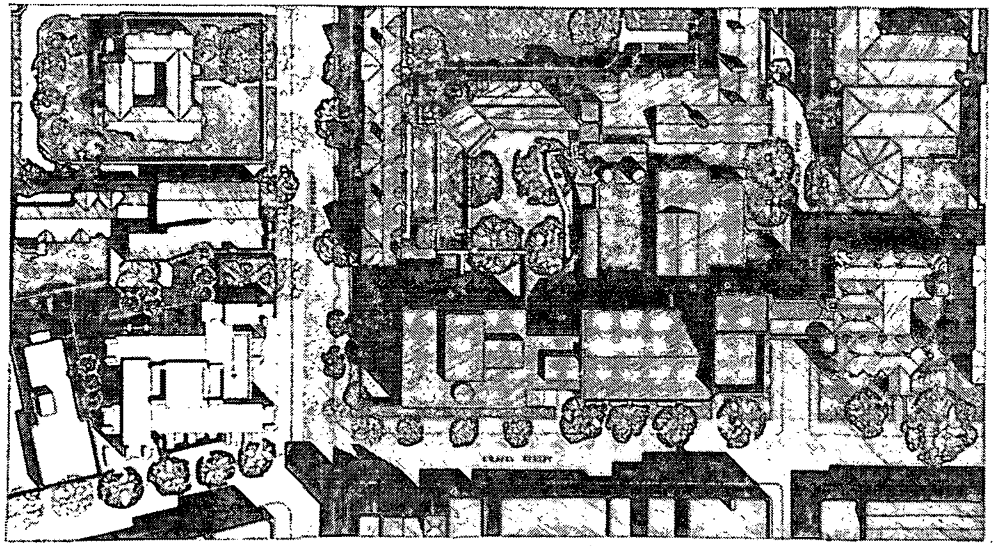
A, B, C, D

Art and Architecture Building, Yale University (1962)

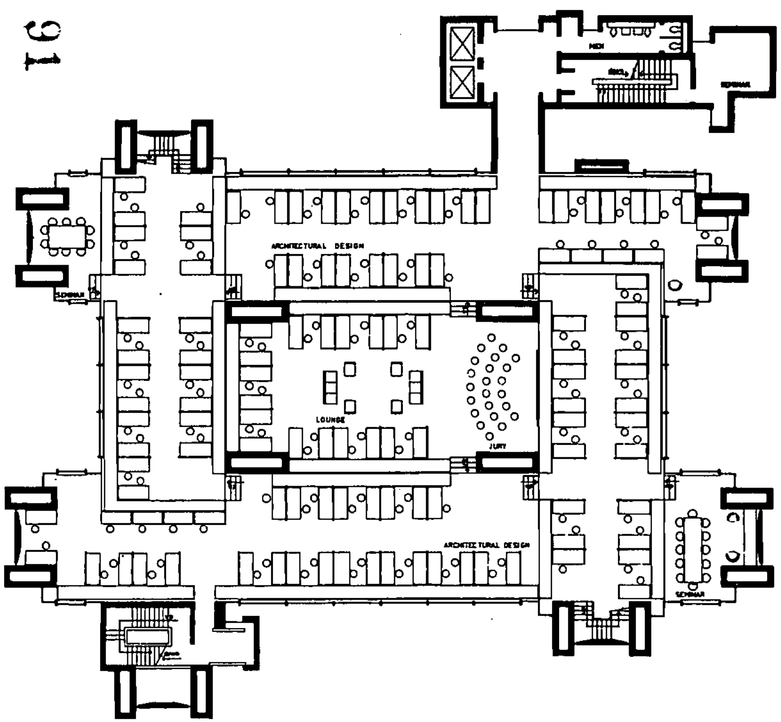
New Haven, Connecticut
Men
Private
Spring 1962 Enrollment: 8,214
Architect: Paul Rudolph

The building was designed to shelter student architects, painters, sculptors, planners, and graphic designers under one roof, hopefully restoring the arts to a unity they once had. This principle has been carried through in the design of sub-areas in the building. The architecture department, for example, on floors four and five has been designed so that each of the five years has its own platform, but the drafting room is still essentially one large room bringing all faculty and students close together. Similarly mezzanines on floors five and six bring the planners into contact with the architects.

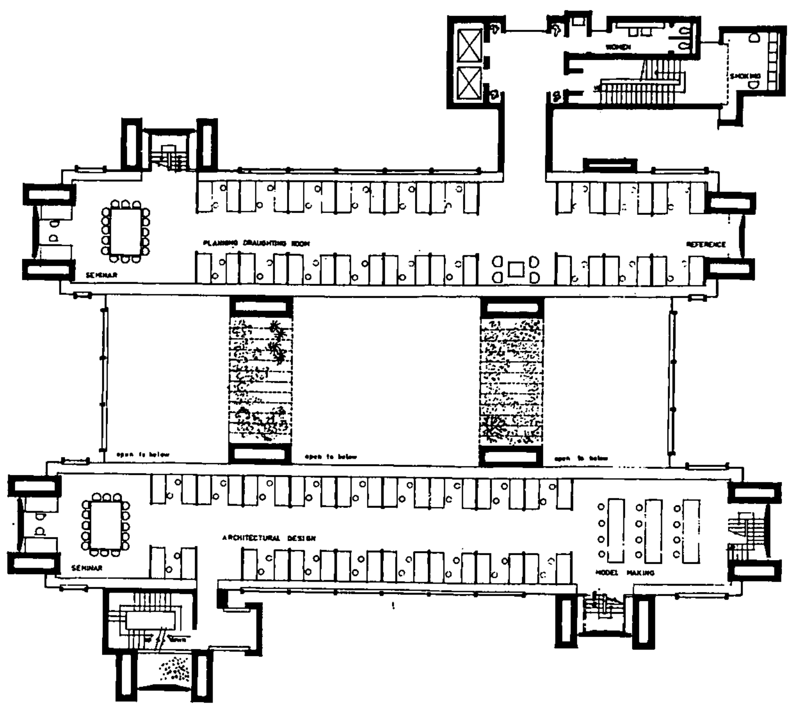
The Art and Architecture building and Louis Kahn's Art Gallery across the street will form a visual gateway to Yale University at the intersection of Chapel and York Streets. The identification of a gateway will be helped by the use of masonry (aggregate concrete) and the scaling of the York Street facade of the new building so that it restates the horizontal layers of the Art Gallery across the street.



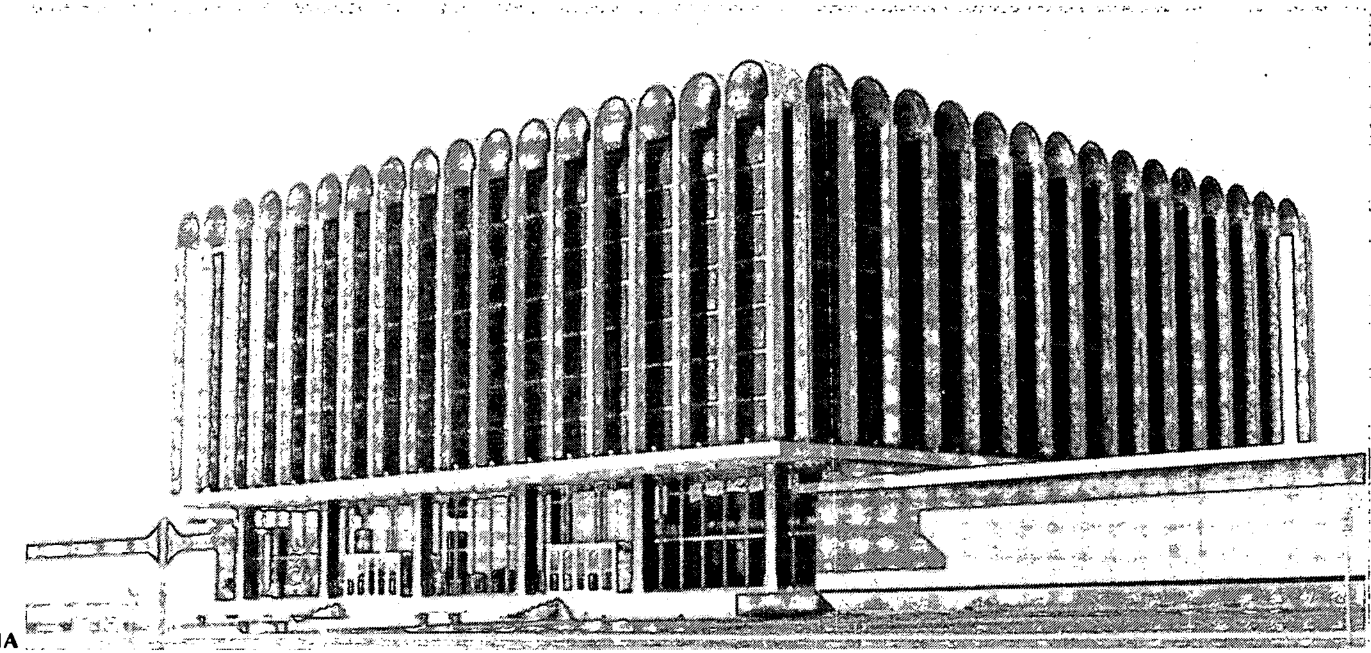
14B



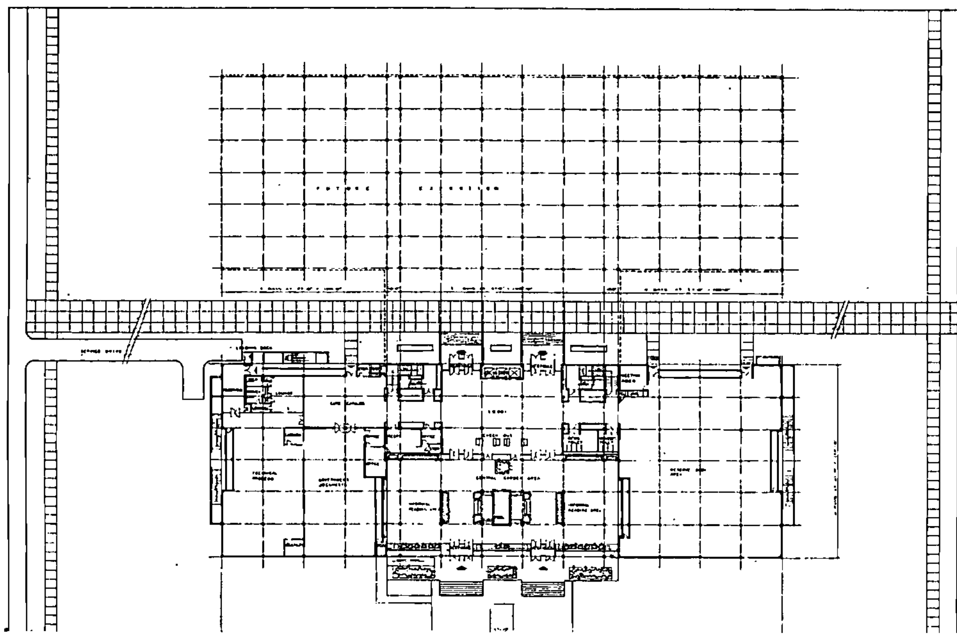
14C



14D



1A



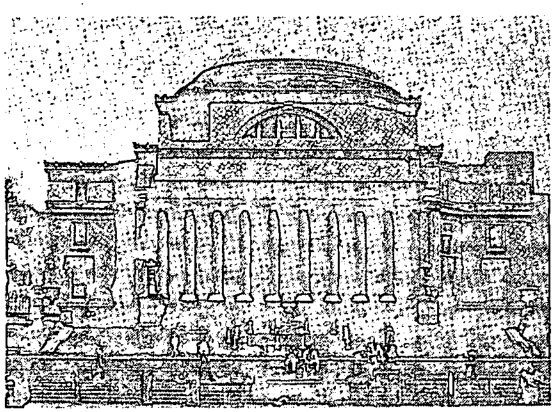
1B

1A, B, C
Library—Texas Technological College (1962)
Lubbock, Texas
Architects: Pitts, Mebane and Phelps
Supervising Architect: Nolan E. Barrick

1C

3. Libraries and Museums

"... the most beautiful building on campus, clearly reflecting by its symmetry and balance, the triumph of the architect over the librarian."
LOUIS R. WILSON AND MAURICE F. TAUBER
"THE UNIVERSITY LIBRARY"



2
The Triumph of the Architect over the Librarian
Low Library, Columbia University

From the viewpoint of architecture and educational purpose college and university libaries uniquely reflect the special characteristics of American higher education as it has evolved in the past three centuries. The emerging prominence of the library as a central building of special importance on campus can be traced in several ways—growth in acquisitions, improvements in methods of operation because of technological advances, and changes in attitudes toward planning and designing library buildings.

The first American college was built around a group of books left to the school by John Harvard. A century later (1736) the Harvard College catolog listed 3,000 volumes. Two-thirds of these were sermons and religious tracts. Similarly at Brown University (1782) the president noted that the school's 3,000 books were "mostly theological and not well chosen, being such as our friends could best spare."[1] This inadequacy denied students access to Shakespeare, Dryden, Chaucer and Poe. Scarcity and poor titles continued to be a problem for another half century. Yale (1841) had perhaps the largest non-theological collection, but its entire library of 41,000 books was small in comparison to the German universities of the same period: 400,000 books in Munich, 240,000 in Dresden, and 200,000 in Wolfenbuttle, a University town of 7,000 inhabitants.[2] The place of the library in early 19th century education is evident in the Trustees report (1818) for the University of Georgia: "The library now contains more volumes . . . than will be read by the student whilst in college." But while the Georgia library was the largest in the South, it wasn't big enough to have a room of its own.[3]

Beginning with the University movement just after the Civil War, the American college and university library dramatically changes in scope and importance. Yale with 55,000 volumes in 1870 had 400,000 in 1903. A 1906 census showed that total acquisitions in the United States had reached the ten million mark, with a value of $13 million, which was close to the total worth of all scientific equipment on campus. By 1940 there were 23 universities with collections over 500,000 volumes. Harvard at that time had over 4 million books which made it one of the largest libraries in the world. It has 6 million today.

Size alone is no indication of a library's role in education. The significance of the growth of the American collections is also related to the fact that the increase in number of volumes was accompanied by innovations that allowed readers to obtain the new books easily. With greater funds for acquisition, the rise of special collections, and the increase of knowledge through research there arose the "librarian's paradox"—the constant readjustment of the books that are in demand, with no interference with the reader's convenience.[4] The problem was solved through superior techniques in classifying and cataloging books, so much so that a contemporary observer (1906) noted that frequently as many days are required for drawing a book in the library of a German university as are minutes in drawing one in the American college.[5]

Electricity and longer library hours give important impetus to higher education, two aspects of library operation that may seem trivial today. The early libraries were generally open only one day a week, for a couple of hours in the afternoon. Tucked away in an obscure corner of the college building the reading room was inconvenient and badly ventilated. Readers shared a public candle and could hardly see the books that were there. As late as 1868 the library at Columbia was open only two hours a day. In 1877 one in seven college libraries were not operating daily. A. D. F. Hamlin summarized the situation in 1925: "As I look back over 50 years of graduate life, the provision for the use of the library, alike in Amherst where I was graduated and in Columbia where I began teaching in 1883, was so meager as to be absolutely ridiculous."[6] Within one lifetime then libraries had changed from a minor activity to a major role in education.

Libraries became a subject of architecture in the "classical era" beginning in the 1880's. From then to 1930 "considerable

weight was given to architectural effect in library construction and minor attention to functional requirements. Monumental buildings were constructed which were architecturally impressive, even if they were not well suited to their purposes as libraries."[7] Library design was mainly a conflict in forms, the circle versus the rectangle, as Tilton suggests in his review of library planning (1933).[8] Traditional libraries were rectangular: Hadrian's in Athens, the monastic libraries, the Vatican, Merton, Bodleian, and St. Genevieve. In search of dramatic form Charles McKim started the novelty of the circular reading room at Columbia University—a fad picked up in the design of the Library of Congress, Alleghany College, Methodist College and many libraries built under the Carnegie grants. The dome covered room, however, proved to be impossible to enlarge and awkward to read in; noisy, badly lighted and difficult to fill and empty.

Designers intuitively felt the importance of the library as a focal building, perhaps more for its compositional effects in the overall campus design than for educational reasons. The dome shaped buildings were succeeded by the tower, and the tower in turn by the application of heavy decorative effects to the basic structural plan. There were two schools of library design, those who relied on classical motifs applied to the facade, and those who believed in the embellishment of the building with symbols and emblems. Of the latter, the University of Texas library is interesting. If the architects were not completely sure of the purpose of higher education, or the purpose of a library, at least their selection of symbols and emblems plastered all over the building reflected some attempt at assessing the state of knowledge in the 1930's: the coats of arms of the 12 great universities under the cornices; the five great alphabets of western civilization and printers' marks on the walls; stained glass windows with names of the masters of literature; painted ceiling beams and brackets bearing the flags of the old world people making up the Texas population.

SIGNIFICANT CHANGES

Through 1945 architects were refining 19th century library designs while ignoring significant changes in library operation. Several of the changes are worth noting because of the implications they have today on campus planning and building design.

First is the change in the contents of the library from a collection of books and a catalog to a central dispensing unit for a wide range of materials. These listings are illustrative of a contemporary library's holdings:

Circulation collection, general book collection, reference collection, research collection, rare books, periodicals, serials, government publications, government documents, newspapers, dissertations, theses, manuscripts, maps, music, incunabula; printed items in unusual forms, archival and near-print materials, non-printed materials and museum pieces; photographs, films, recordings, audio-visual aids.

Secondly, on some campuses the central library facility is being replaced by a decentralized library system. The larger universities are finding it impossible to provide all the necessary facilities in one building. A decentralized system may be thought of as a main library and several branches. The system would consist of:

Reading space and browsing libraries in dormitories.

Departmental libraries with special collections.

Research libraries devoted to collections of a specialized nature such as the Chinese collection at Harvard, Hispanic-American materials at Tulane and the University of Texas.

Undergraduate library.

Main library—containing all the technical processes and major general reference and research collections not distributed to the branches.

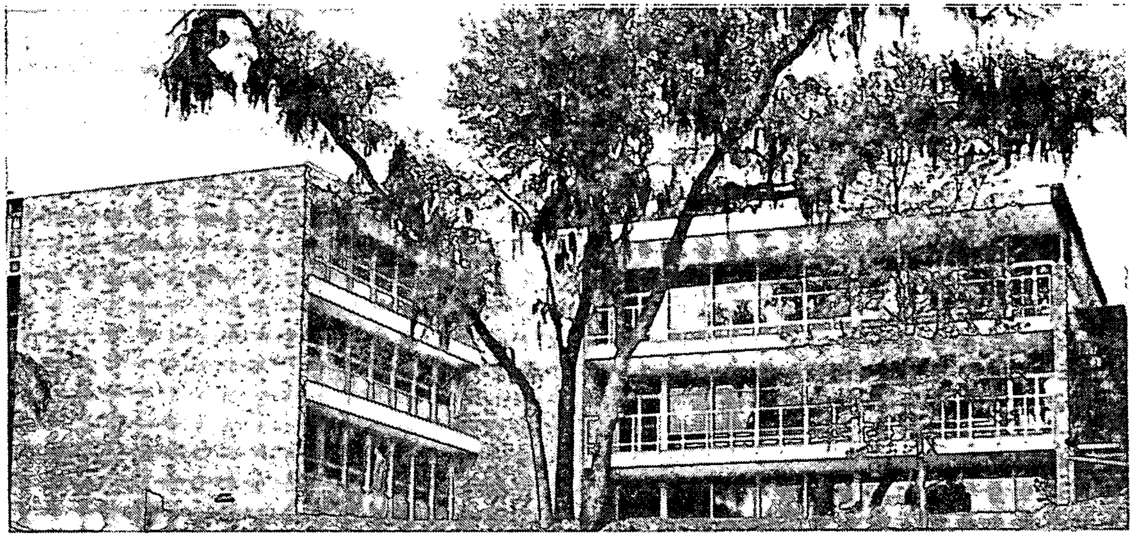
Thirdly, the growth in resources and expansion in materials has been accompanied by a greater demand for space in the library for the use of people using the collections. The library building now contains seminar rooms, listening rooms, auditoria for viewing films and slides, rooms for typing, cubicles for self-study, smoking rooms as well as reading rooms. Technical processes such as photostating occupy special spaces, as well as cataloging, binding, and administration rooms, along with toilets, storage and general workrooms. Further developments in the technology of information storage and retrival are expected to change the nature of the library, such as microcards, electronic data machines and other devices. But no system is yet in sight which would significantly alter the present pattern of reader and book, which is still the most efficient method of transmitting knowledge. Probably any mechanical system will be ancillary to, not a replacement of, present library facilities.

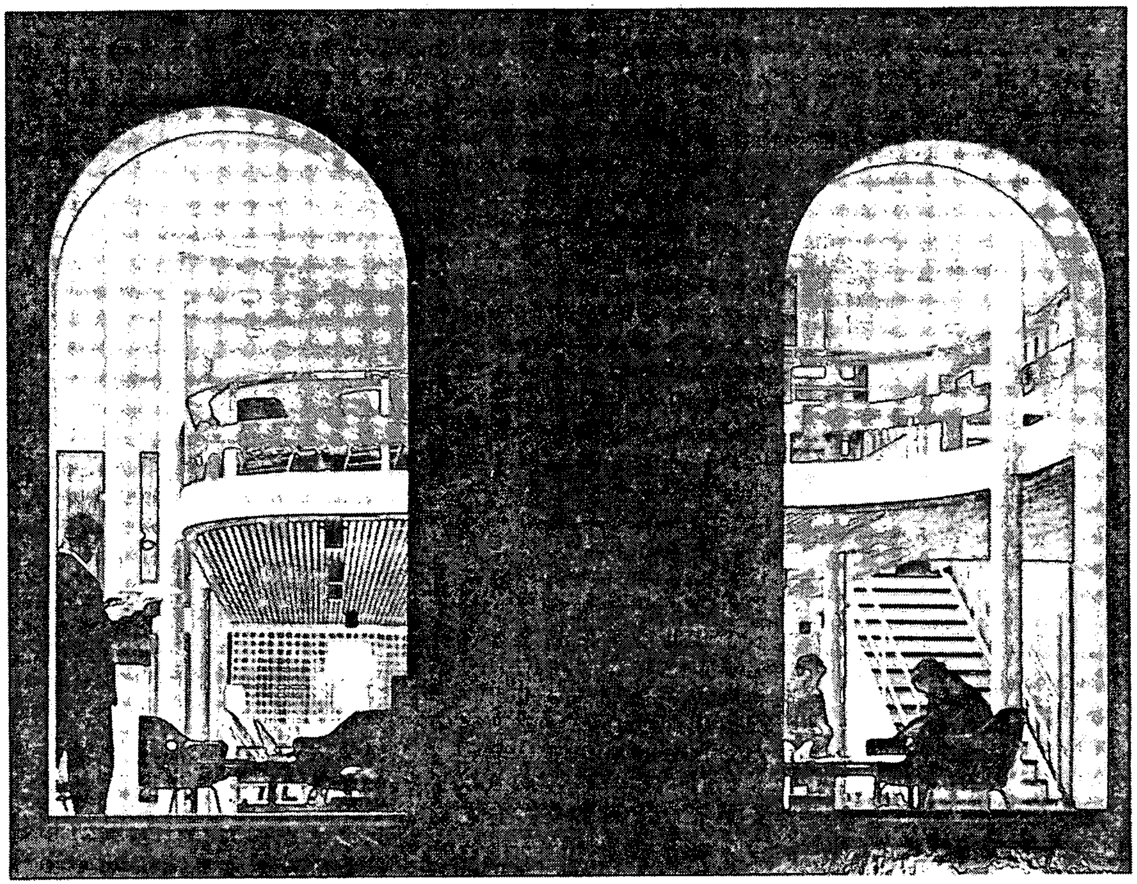
The fourth significant change in the last few decades is the growing percentage of people using the library. The usual index to library use is the reader station, i.e., a space reserved for a reader. Early in the century American college and university libraries could accommodate less than 20% of their enrollment at one time. The present standard recommended by the Association of College and Research Libraries is 30%. Several institutions are attempting to provide 50 reader stations per 100 students. As a heavier responsibility is given to students to take the initiative in learning, "it is possible that 95% of the students will be studying in the library six hours a day."[9]

The fifth aspect of library development that has affected design and planning is the change in attitude about bringing books and readers together. Traditionally books were kept away from readers in closed stacks and were distributed through call systems in which the reader identified which book he wanted on a slip of paper, waited for the book to be taken from the shelf, stamped and turned over to him. Except for special scholars who were permitted to examine the stacks, self-searching (an important part of reading-learning) was impeded. A University of Minnesota study indicated that 35% of all call slips could not be immediately supplied

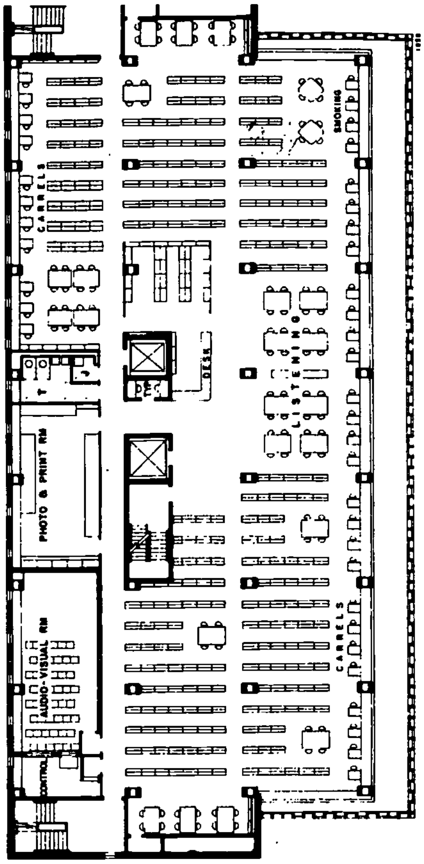
…cause the books requested were already in …, lost, stolen or misplaced.[10] The introduction of the open-stack system, in which readers can go directly to the shelf and choose a book, did much to alleviate the waiting problem and encourage reading.

The open-stack philosophy of library operations was helped along by the modular planning system. The term modular planning is often applied to the organization of space within a building and the establishment of measurements for a rational system of coordinated construction. In library planning modular planning means great interior flexibility as opposed to a rigid building with fixed dimensions. Ralph Ellsworth, in his useful book *Planning the College and University Library Building*, identifies Angus Snead Macdonald as "the imaginative pioneer in the field of library construction" who "began to sense the need for a type of library in which spaces might be used for either the storage of books or work space for people."[11] Though Macdonald wrote about his ideas as early as 1933, modular libraries weren't built until late 1945. In considering the continuing change in library operations the flexibility of modular planning is necessary in any library building being programmed today. How to obtain this flexibility is of course a central problem in architecture, which Ellsworth incisively discusses in his book.

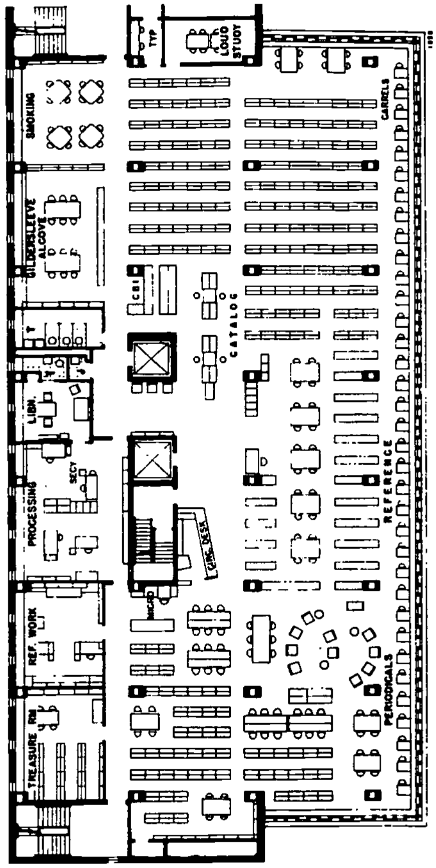

3A


3B

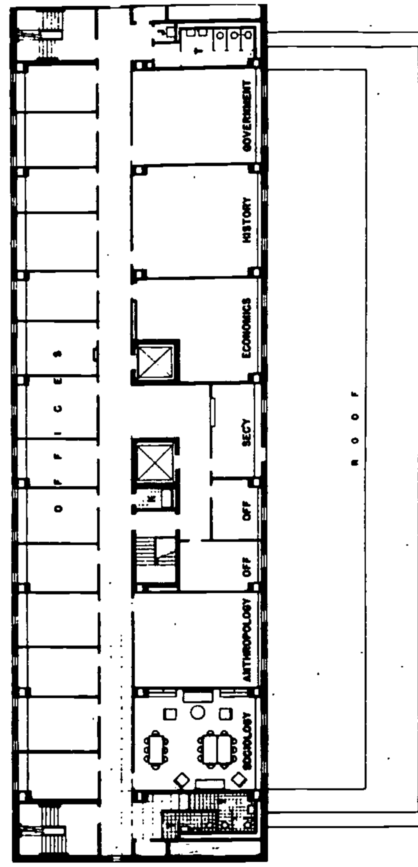
3
Conversions and additions
Expansion needs can be satisfied without compromise to aesthetics or function through conversion of existing spaces or the construction of new wings on older buildings.
3A
Swisher Library Addition (1959)
Jacksonville University (Florida)
Architect: Reynolds, Smith and Hills
3B
Boylston Hall, Harvard University (1960)
View of the departmental library of the Romance Languages Department. (See page 71.)
Architects: The Architects Collaborative


CARRELS
SMOKING
DESK
LISTENING
PHOTO & PRINT RM
CARRELS
AUDIO-VISUAL RM
CONTROL

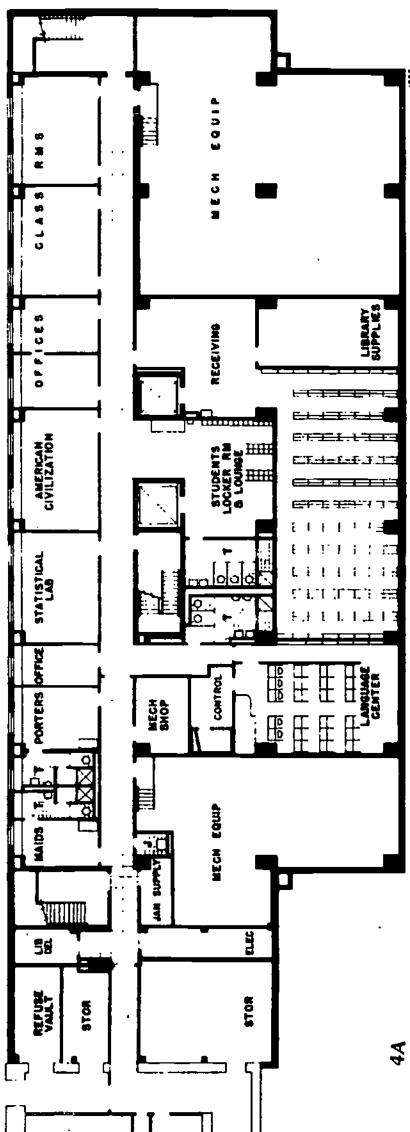
4C


TYP
LOUD STUDY
SMOKING
CARRELS
GILDERSLEEVE ALCOVE
CATALOG
LIBN
SECY
PROCESSING
CIRC DESK
REFERENCE
REF WORK
PERIODICALS
TREASURE RM

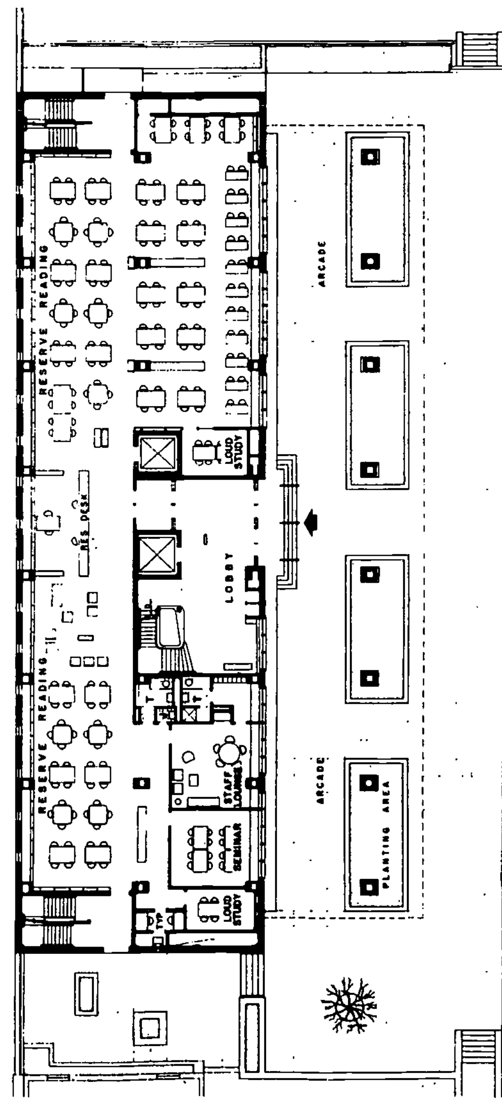
4D


GOVERNMENT
HISTORY
ECONOMICS
OFFICES
SECY
ROOF
OFF
OFF
ANTHROPOLOGY
SOCIOLOGY

4E

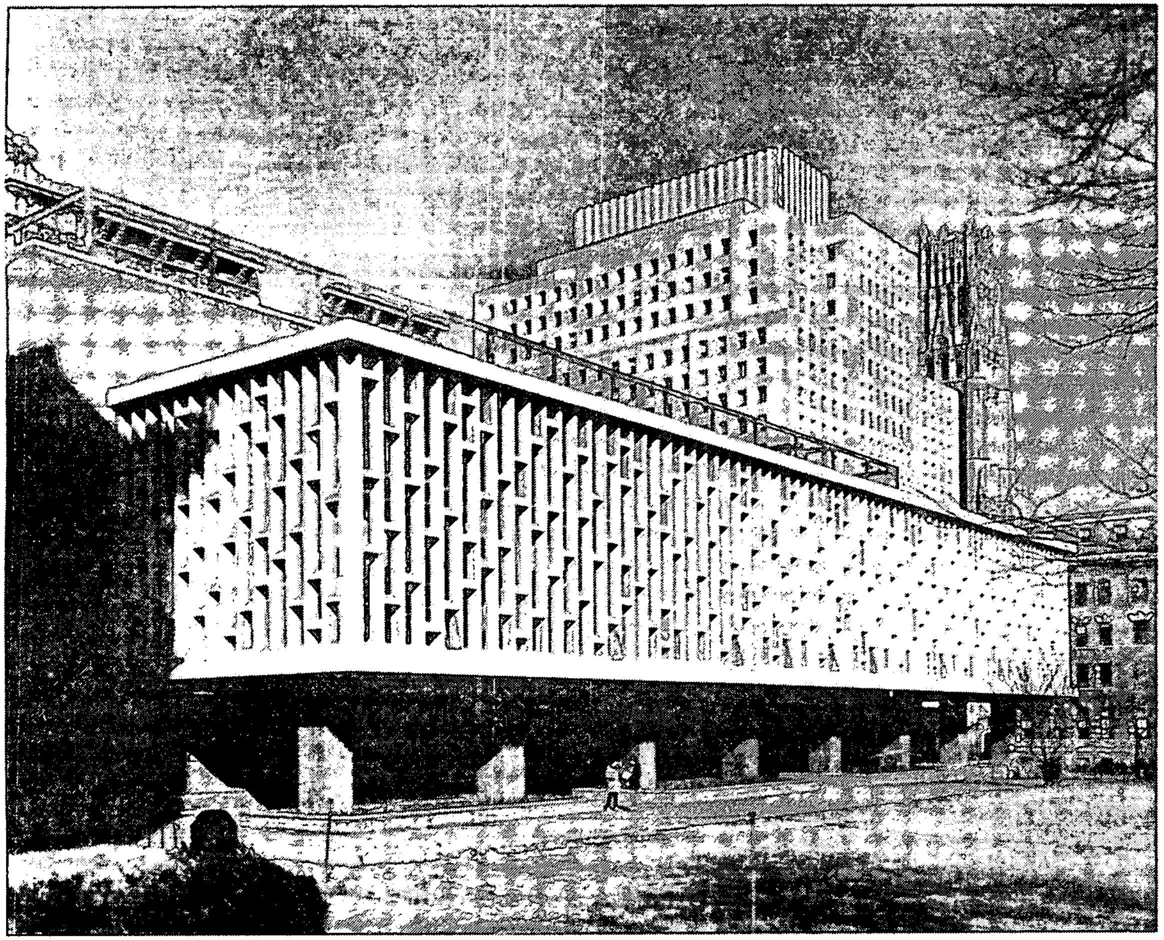

RMS
CLASS
MECH EQUIP
OFFICES
RECEIVING
LIBRARY SUPPLIES
AMERICAN CIVILIZATION
STUDENTS LOCKER RM & LOUNGE
STATISTICAL LAB
OFFICE
PORTERS
MECH SHOP
CONTROL
LANGUAGE CENTER
MAIDS
MECH EQUIP
JAN SUPPLY
ELEC
REFUSE VAULT
STOR
STOR

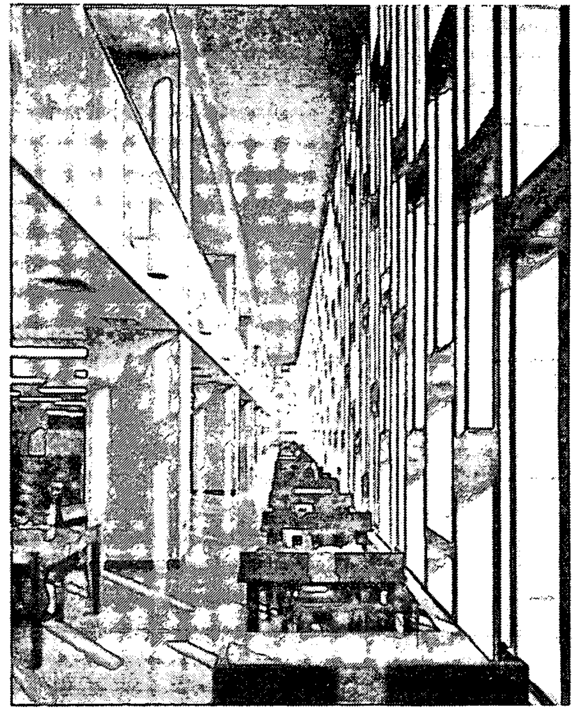
4A

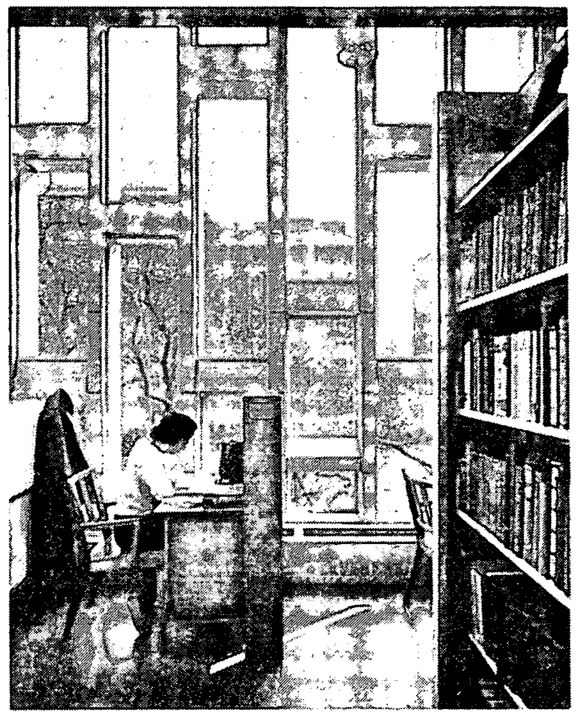

RESERVE READING
ARCADE
LOUD STUDY
RES DESK
LOBBY
RESERVE READING
STAFF LOUNGE
ARCADE
PLANTING AREA
SEMINAR
LOUD STUDY
TYP

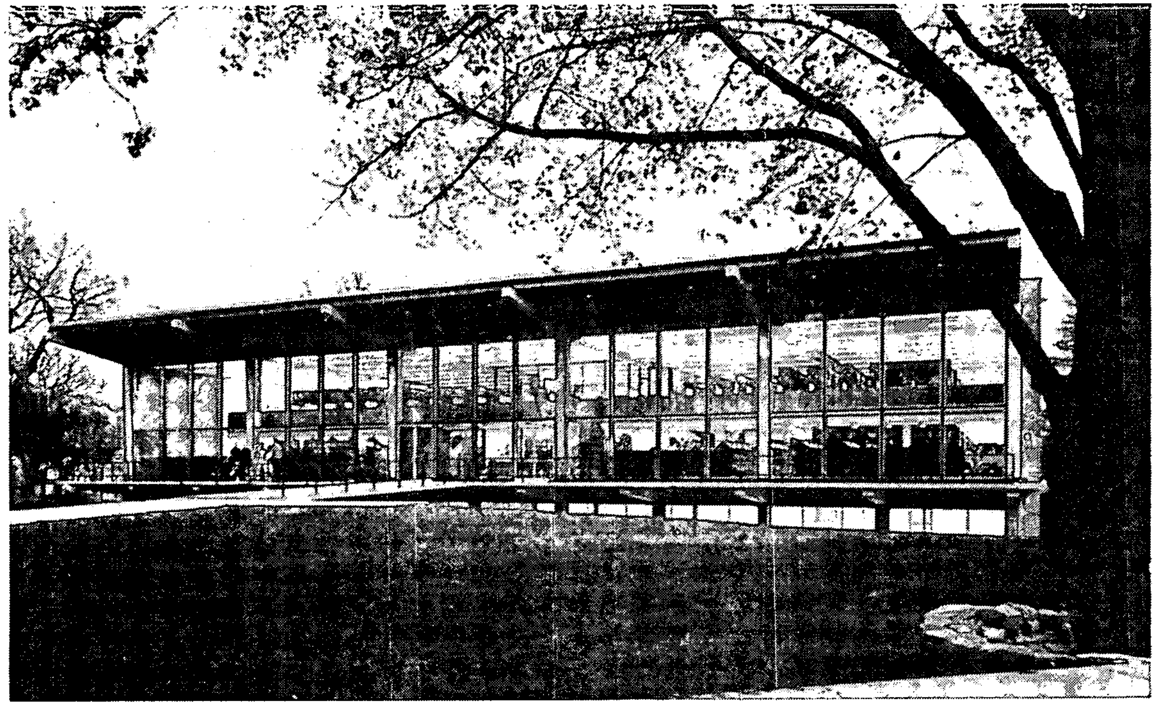
4B

4A, B, C, D, E, F, G, H
Library-Classroom Building, Barnard College (1960)
Architects: O'Connor & Kilham
4F
East facade library classroom building
PHOTO BY: PETER N. PRUYN
4G
Typical carrel.
4H
East wall view of carrels and mezzanine floor with open stacks.
PHOTOS BY: EZRA STOLLER


4F

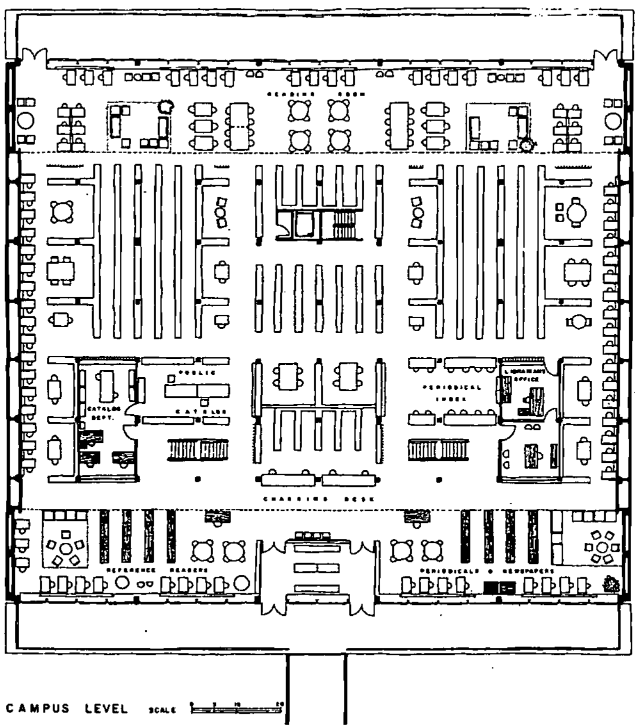

4G


4H



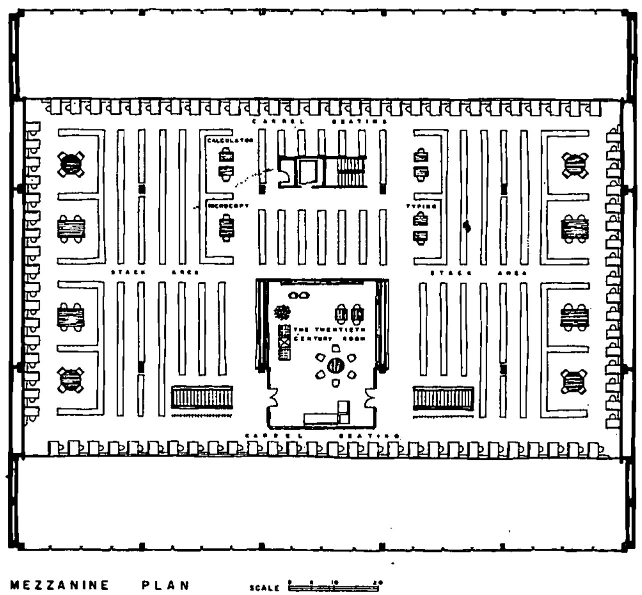
5A

5A, B, C, D
Burling Library, Grinnell College, Grinnell, Iowa (1961)
Architect: Skidmore, Owings, & Merrill
Keyes Metcalf, Library Consultant
This library reflects current design trends: entrance at the middle level, modular system of library planning, seating capacity close to 50% of enrollment with open stacks. Present collection numbers 210,000 volumes and there is expansion room to 350,000 volumes. Seating capacity can be increased from 541 reader stations to 550. Building was planned on a 40 by 27 foot bay size and is air-conditioned.
PHOTO BY: BALTAZAR KORAB



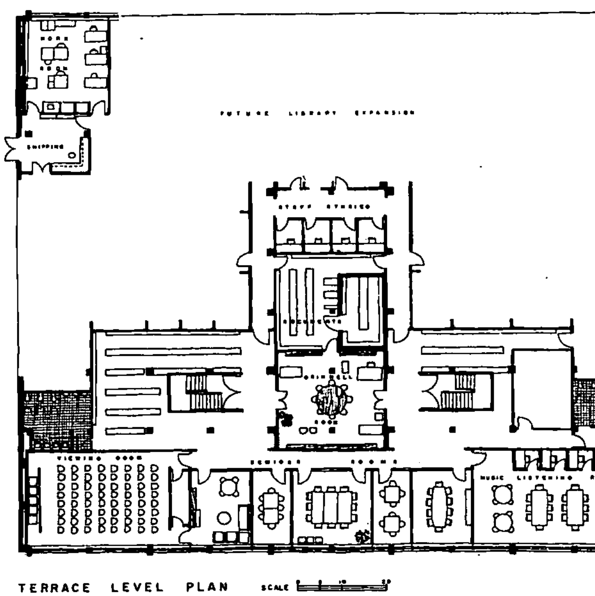
CAMPUS LEVEL

5B



MEZZANINE PLAN

5C



TERRACE LEVEL PLAN

5D

THE LIBRARY IN THE CAMPUS PLAN

Libraries will vary from institution to institution in accordance with the level of education being offered and academic programs. Variables such as enrollment size, funds for acquisition and servicing readers, number of students in residence on campus, and the availability of library resources in the region in which the school is located will also affect the size and operational characteristics of the library. For physical planning purposes the two important considerations in handling libraries as part of a campus plan are: the anticipated size of the library and the location requirements. Despite the many variables mentioned the basic components of all libraries are similar enough to allow for common criteria for preparing planning modules. The component parts of the library are: reader space, storage space for books, and service space.

In preparing a planning module these rules of thumb should be helpful in formulating a reasonable planning module. Each step should be undertaken in close collaboration with the institution's library staff and those responsible for academic programming.

Reading space

1. Determine the percentage of students to be accommodated with reader stations.
2. Apply this percentage to the anticipated enrollments for the stage of growth covered by the plan. For example:

3,000 students
30% reader stations
900 stations

3. Distribute number of reader stations according to the type of reading rooms appropriate to the institution's library operation. Multiply space standards listed by number of reader stations in each group.
General reading room: 18 square feet per reader station.
Special reading rooms, such as micro-film or listening stations: 22.5 square feet per station.
Study carrels: 30 square feet per station.
4. To determine faculty reading or research space in library estimate number of faculty stations to be accomodated and multiply by 46 square feet per faculty reading station. The latter figure is a minimum sized space recommended by Ellsworth.

Space for books

The growth of library collections is difficult to predict, though a good guess may be made by taking inventory of existing growth rates and projecting that rate on into the future. This will give a base figure sufficient for general planning purposes.

It can be expected that changes in academic programming towards honor courses, greater self-reliance imposed on the student to teach himself, or changes in the ratio of undergraduate and graduate students will affect the ratio of increase in bookholdings. An unpredictable factor in estimating growth is the paperback edition of standard works. An observer of library development has commented that it would be economically possible to provide a student with a full set of paperback editions for the reading lists in many undergraduate courses at a cost less than that of providing the library services necessary to circulate the same list.[12]

Nationally library collections of a general nature tend to double in size every sixteen years; science collections about once every decade.[13] For general planning purposes it also may be assumed that any library collection then will increase by a factor of 1.5 in a ten year period. Thus a 150,000 volume library would increase to 225,000 volumes in a ten year plan.

In determining the amount of space required for stack space the number of volumes has to be translated into square footage estimates. By dividing the total number of volumes to be accommodated at the end of the planning period by the factor of ten the resulting figure is approximately the amount of square footage required, etc., for shelving the collection.

Service space

The amount of space needed for service varies with the kinds of activities the library will support. Certain basic functions common to all libraries are: circulation control and processing, reproduction equipment, cataloging and processing facilities, storage and washroom facilities. To determine a reasonable planning figure add the reading space and book space and multiply by twenty per cent.

The resulting figure will give an approximate total square footage requirement for service space for the planning period covered in the projection. All figures above are gross square footage.

Exploring planning alternatives

Having estimated the size of the future library further study is needed to determine whether expansion of existing facilities is warranted, or whether a new library building should be constructed. There are few pre-World War II libraries worth continuing in use as a library. Expansion of these monuments is costly and difficult, and usually accomplished only through the desecration of the stagecraft qualities of design they usually possess. Fortunately these older buildings can be converted into fine arts studios, student unions and some types of instructional space. If an existing library cannot be expanded but also must remain in use it may be possible to handle expansion by decentralizing library activities. Departmental libraries can be added to instructional buildings. In the case of a university a new undergraduate library may be constructed and the older facility continued as a reference, research and special collection library.

A decentralized system will be located according to the program of use developed by the institution's library committee. The central facility should be as close to the center of the heaviest daytime student pedestrian traffic as possible. This rule also applies to institutions having a single library facility, for of all the buildings on campus the library has highest priority for a central campus location.

The ideal situation is to site the facility so that readers enter the second level directly into the cataloging, processing and reference rooms; and simply have to go up one level or down one level to the other rooms and service areas.

MUSEUMS

"It is almost terrifying to learn that one museum is started about every four days," writes Leonard Carmichael in *The New Role of the Museum in American Life*.[14] Many new museums are associated with colleges and universities, continuing a tradition that can be traced back to the Mouseion in ancient Alexandria. The collections in American college and university museums range from art to zoology. They serve three functions: research, conservation and exhibition.

The role of museums in higher education is an important one. As early as 1750 Harvard set aside space for "a collection of interesting objects." Other schools had their cabinets of curios which were used by teachers in demonstrating various aspects of their lectures.

With the spread of the University movement college and university museums became important centers of research, sponsoring world wide expeditions to collect the heritage of mankind. The gathering, cataloging, and preserving of minerals, botanical specimens, artifacts, and art became a scientific specialty itself. The organization of the materials to indicate in a graphic manner the evolution of civilization, or some portion thereof, likewise continued to be used in the teaching of subject matter related to the objects displayed.

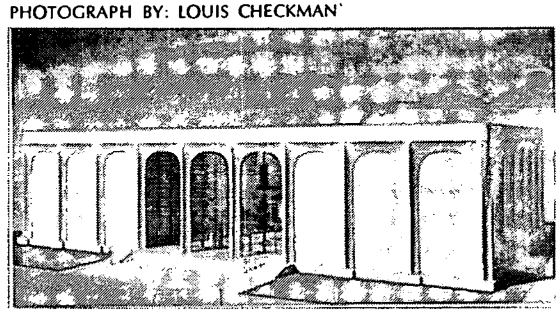
It is only in more recent years that the display of these materials has begun to take advantage of the "increasingly good knowledge of scientific perceptual psychology and of so-called motivational psychology" in the organization of "a teaching document made up of objects."[15] This approach plus an increasing interest in the displays, provoked perhaps by the popularization of the romantic aspects of science and ancient civilizations, has resulted in museums' becoming less of a specialized building, attracting the casual student as well as student or researcher traditionally using the collection.

There are common sense rules of thumb concerning the location of museums in the campus plan. Specialized collections should be housed within the buildings devoted to subject areas they cover, or at least be close by. The use to which the collection is being put, the nature of the exhibitions, hours of operation all must be considered in evaluating any site location. Obviously collections with great regional or national appeal will tend to draw many non-campus visitors—such as the Ware collection of "Glass Flowers" at Harvard. Circulation and parking must be adjusted accordingly. The requirements of security, storage space, exhibition space, curatorial rooms and teaching space vary widely according to the type of collection involved. Because of the special nature of the buildings long-range planning of museums must be made on a case to case basis. Estimates of space needs for building modules and land requirements should be established in close collaboration with those responsible for the operation of the facility.

6
Sheldon Art Gallery, University of Nebraska
Lincoln, Nebraska
Architect: Philip Johnson
Under construction in 1962.

Curatorial, storage and service spaces are located in the basement. First floor contains auditorium and exhibition space, while the third floor is devoted mostly to gallery space. The monumental aspects of the building reflect its major use as an exhibition building. (See also Hopkins Center, Dartmouth College, page 79 and Stephens College, page 68.)

PHOTOGRAPH BY: LOUIS CHECKMAN



FOOTNOTES

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7

Library, University of Portland (1960)

Portland, Oregon

Architects: Wolff and Zimmer

A simple building with handsome interior spaces, this facility follows the modular system of library planning. Seats are provided for 350 students and 160,000 volumes—enrollment 800 students.

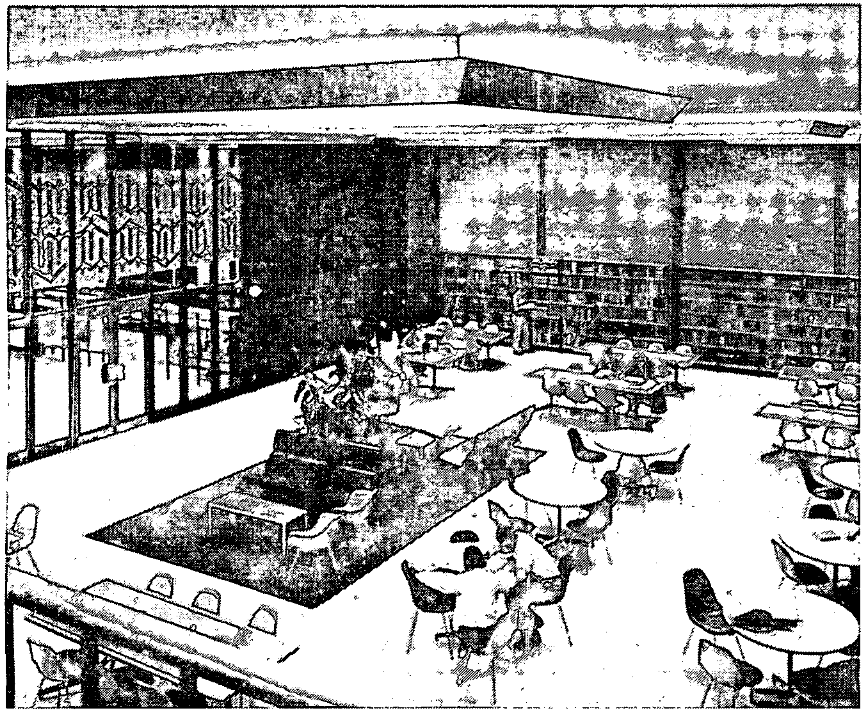
PHOTOS: G/H PHOTOGRAPHERS

7A

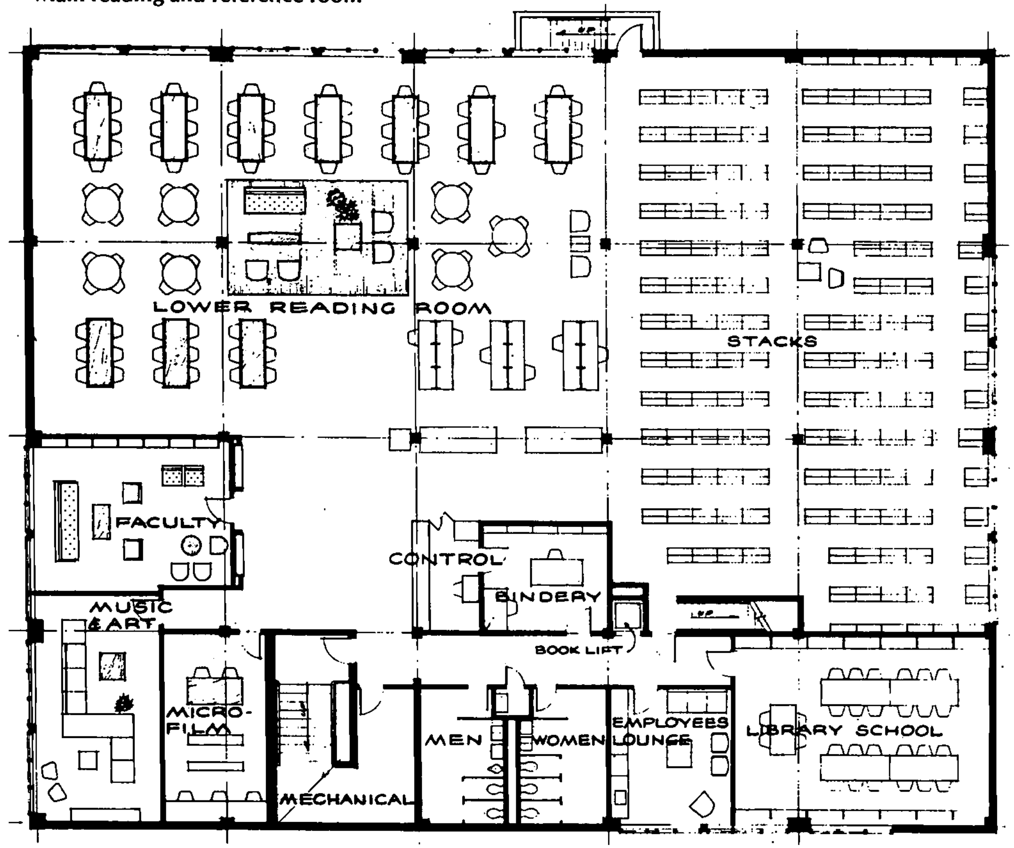
Floor plan ground level

7B

Main reading and reference room



7B



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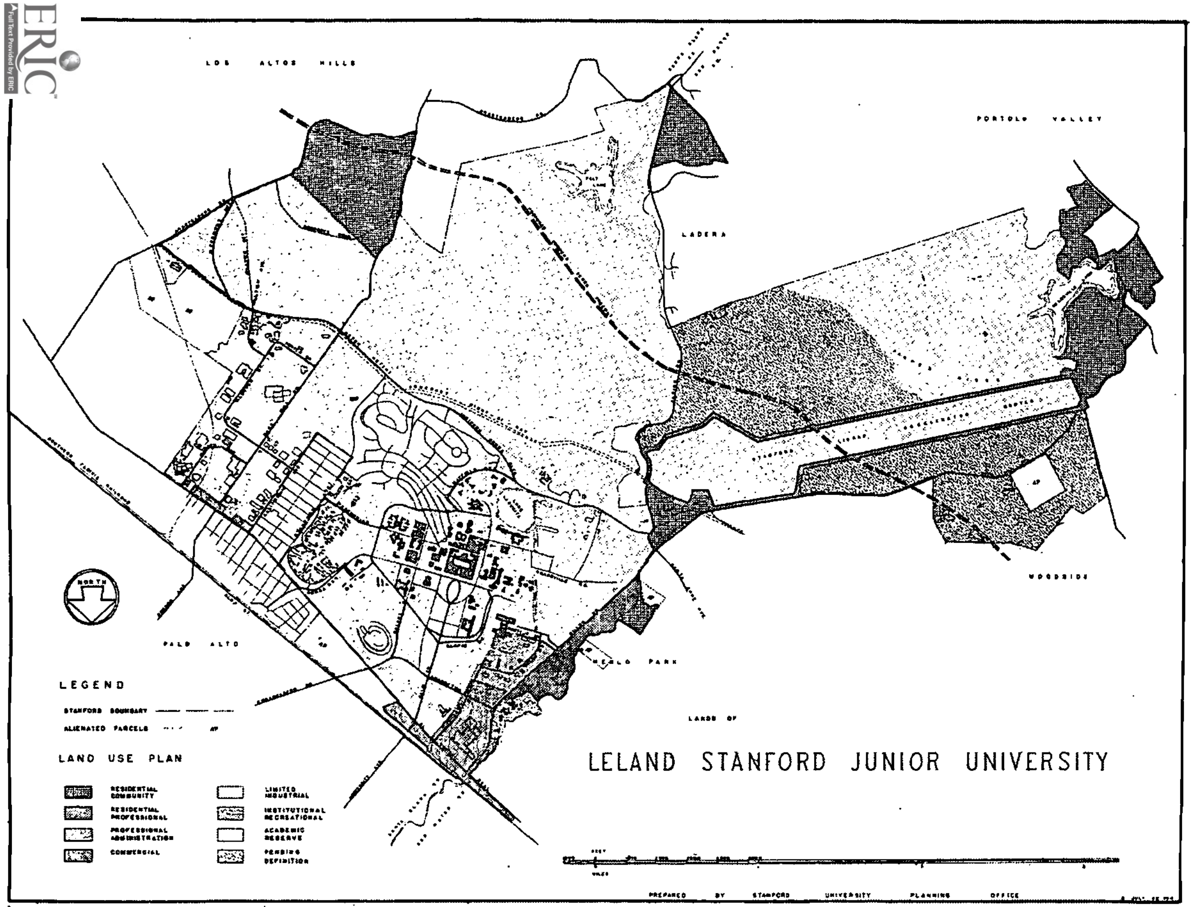


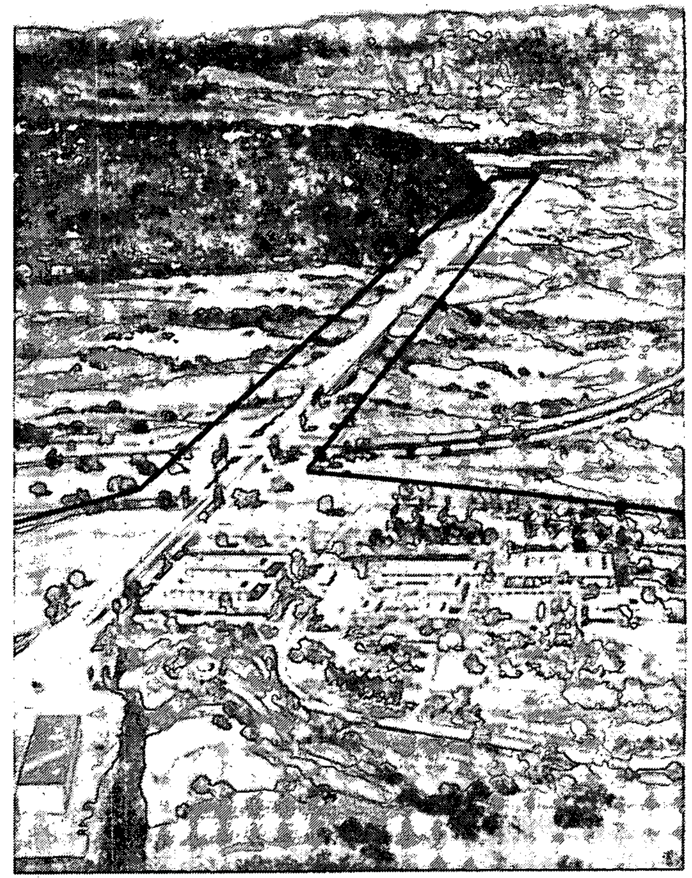
1A
The land use plan of Stanford University
The Stanford Linear Accelerator is shown above in relationship to the other land uses.

102

1B
Rendering of Linear Accelerator

including the 10,000 foot long Klystron Gallery. The total research station occupies 480 acres, lying within a strip of land 3 miles long and 1,000 feet wide. Underground portions of the facility will be constructed by cutting a level trench through elevated areas and filling depressions with the excess earth. Areas disturbed during construction will be restored as quickly as possible and replanted with natural grasses. Natural landscaping is planned for areas where the land contour is changed.

The facility will include eight major buildings, of 30,000 square feet or more. Special design studies are being made to assure the University of maximum attractiveness and efficiency in the layout. It is expected that the accelerator will operate day and night to accomplish a maximum of work. Expected scientific population using the facility: 92; total operating personnel: 730 persons.
Project architect: Charles Luckman Associates
Estimated cost: $114,000,000
DRAWINGS COURTESY OF STANFORD UNIVERSITY PLANNING OFFICE



1B

4. Research

Research is the methodical, systematic, directed study of a subject which is still largely unknown. Research is said to be *basic* when it is undertaken solely to increase the general store of knowledge, and *applied* when it is directed toward practical application of the knowledge uncovered. The engineering aspects of research have come to be known as *development*, which is the systematic use of research for the design and production of materials, devices, and prototypes; or for the organizing of methods, processes and systems for production.

Research flourishes in institutions of higher learning because colleges and universities provide the opportunities for the continuance of the scientific movement: money, leisure, freedom of pursuit, coupled with ideal conditions for scholars to come together to exchange ideas and techniques.

HISTORICAL PRECEDENTS[1]

Every educational system since Aristotle has encouraged scientific inquiry, but the flowering of scientific genius occurred in the 17th century. The effect on the American campus was not immediate, for Cambridge and Oxford served as models for the early American colleges and neither English school fostered a scientific curriculum. An ecclesiastical bias against science at Oxbridge was strengthened by the decrees of the Restoration Parliament in 1662, which excluded many non-believers from residence or teaching. The Dissenters, as many non-Anglicans were called, formed their own universities, particularly in Scotland where the growing mercantile class gave consistent support to studies of a "practical nature." The "new learning" at Aberdeen and Edinburgh soon influenced the curriculum at Harvard and Princeton as the colonial colleges became secularized. Rapid acceptance of science as an academic subject can be measured in part by the fact that the first endowed chairs in American colleges were in science and mathematics. Jefferson believed that the only hope for the development of the South lay in science, "unshackled by the clerical chains of New England."[2] By the time of the Revolutionary War, distinguished laymen such as Benjamin Franklin and other American scholars published significant contributions to the body of knowledge here and abroad.

President Meigs of the University of Georgia typifies the early 19th century scientist-educator, "constantly measuring or seeking an explanation of some force of nature." Meigs discovered how hail was formed and, for Congress, investigated variations among magnetic needles. His curiosity led him to calculate such things as bottomless pits. In one instance he measured through the use of gravity formulas "how deep in hell the (lost) Angels plunged in their nine days of mad flight."[3]

Except for observatories and an occasional demonstration room, scientific experiments and research were carried out in the professor's chambers or in the attic and basement of the college building. The largest investments were made in apparatus and specimens, and cabinets for displaying them. The teaching museum eventually evolved from the latter. Research was given further impetus when scientific and technical curricula were reorganized, and special schools were founded in the subjects. Rensselaer Polytechnic Institute, the scientific departments at Harvard, Yale, Dartmouth and Brown, and Massachusetts Institute of Technology provided courses in laboratory investigation. Research became a tool for learning.

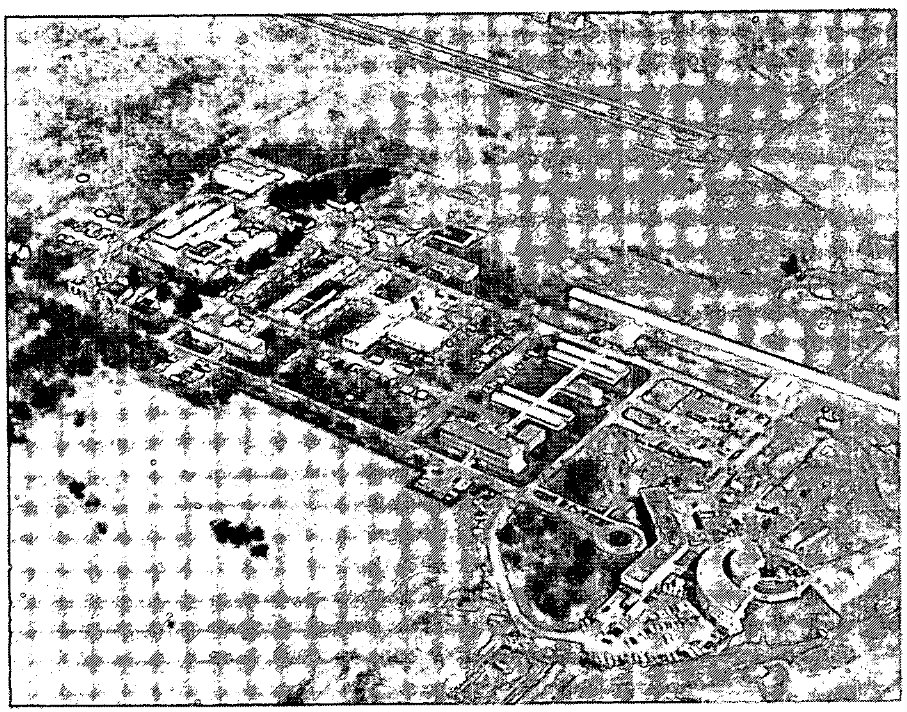
The vital leap in academic research in the United States came after the Civil War with the adoption of *Wissenschaft*, the German University empirical approach to knowledge. The German method was itself a transplant, combining the French habit of exact thought with the German propensity for thoroughness and patience. The German scholars had an unusual eagerness to collect data. They led all scholarship into the land of compendious footnotes.

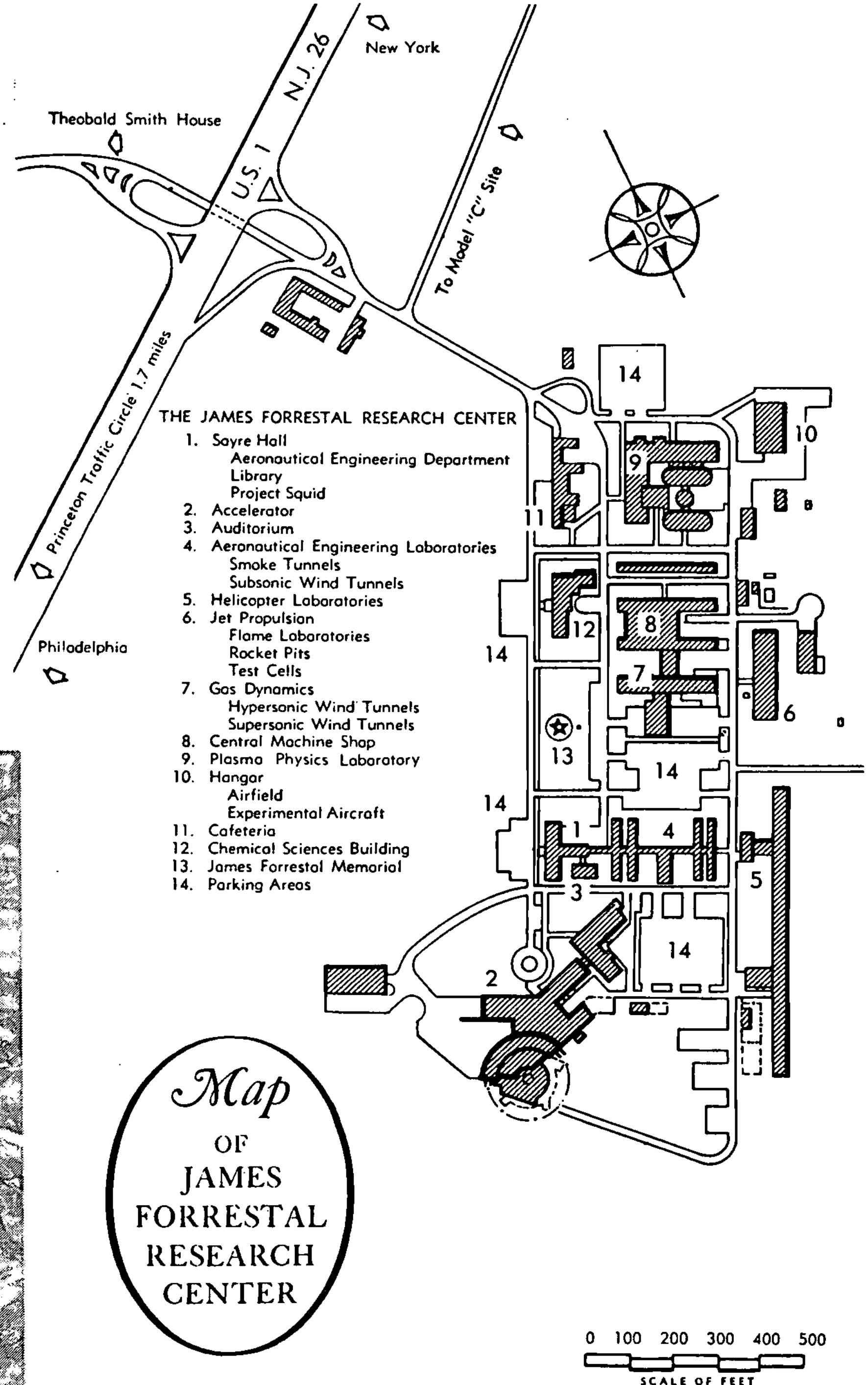
Wissenschaft began in the humanities and moved to the sciences as the benefits of industrialization became noticeably connected to the widening of the theoretical base of technology. German universities drew American scholars in numbers, partly because of ethnic ties among the emigrants, partly because American and German economic growths were parallel, but mostly because German scholarship was unexcelled. Between 1865 and 1914, over ten thousand Americans received part of their academic training in Germany, half the number at the University of Berlin. Returning home, they influenced the development of both private and public universities, first by giving science equal academic footing with the humanities, and later, by demonstrating the usefulness of research for achieving social goals. By 1900, research was the stepping stone for the production of young scientists and the device by which faculty should be measured for advancement through the academic ranks.

The simple pattern of academic research continued through the 1930's, carried on in

buildings which were hardly distinguishable in their external appearance from any others on campus. Perhaps the only exceptions were the agricultural research stations, observatories and large sheds containing heavy engineering equipment. Occasionally, an institution would accept a grant from private industry to investigate an area of knowledge in which a faculty member had unusual competence, or a college might keep its solvency by linking its good name with that of a manufacturer or trade association under the terms of an endowment for "research." Federal aid for research was considered unconstitutional, though the national government breached the legal wall in World War I with training programs and with direct student aid under terms of the National Youth Administration Act during the 1930 depression.

2A, B
Air view James Forrestal Research Center
Princeton University
AIR PHOTO AND MAP COURTESY OF PRINCETON UNIVERSITY





ESEARCH SINCE WORLD WAR II

World War II brought great changes. Leading institutions were assigned special missions in research and development. Many colleges and universities provided pre-military and military programs for the armed forces. After 1945, the veterans' training bills spurred expansion of all campus facilities including research. About the same time the present alliance between university, Federal government and industry was forged. The Office of Naval Research, Office of Scientific Research of the United States Air Force and the Office of Ordnance Research of the United States Army were organized to support basic and applied research in institutions of higher learning. The National Science Foundation was assigned a similar task in 1950 while the Atomic Energy Commission and U. S. Office of Education also provided major funds for research in colleges and universities.

At a representative number of institutions surveyed in 1960, about twenty-four out of each 100 dollars of instructional salaries derived from sponsored research. In contrast, little if any of the instructional salary came from this resource in 1946.[4]

Research and development are the core of the Federal government's scientific activity today. Expenditures jumped from 7.7 billion dollars in 1960 to 10.2 billion dollars estimated for the fiscal year 1962. Over ten per cent of the total 1962 budget will be spent in contract research at colleges and universities. Of the basic research grants, 41 per cent were assigned to educational institutions. The number of institutions participating in these grants now number over 400 or about one out of five colleges and universities. Over ninety-five per cent of the money in 1962, was allocated to the physical and natural sciences. In the future it is expected that these grants will increase in number, and in addition, larger appropriations will be made for the social sciences, particularly those investigating human behavior.

An analysis of the fiscal year 1958 research contracts showed over 70,000 scientists and engineers engaged in research and development on 377 campuses. Of this group 32,820 were faculty members. 10,652 of the faculty were engaged in full time research and development, and 22,168 part time.[5]

The increase in research activity has had several effects on campus planning. Space requirements are the highest per user of all functions supported. Studies at the University of California and the University of Colorado have shown that where 100 gross square feet per student are required for lower division activities, 200 gross square feet are needed for upper division students, and 500 gross square feet are needed for graduate students. Research tends to be concentrated in the graduate division. It is of interest to note that the National Science Foundation estimates that 300 gross square feet are needed in research buildings for each full-time person. The university figures include all research facilities, faculty and departmental offices, instructional space, and supporting requirements associated with major graduate programs.[6]

Research space tends to be the most expensive campus construction, primarily because of equipment costs. Present averages are about $40 per square foot for installed space, and this is expected to rise to $60 per square foot in the next decade. Programming this large costly space is further complicated by the uncertaintities of success. When the frontier of knowledge is broken a new surge takes place. Some research presents radiation hazards, and other research is accompanied by obnoxious noises, fumes and other nuisances, such as the movement of heavy industrial equipment. Finally, while all recognize the desirability of keeping teaching and research in close proximity to one another, it is difficult to justify placing large, space-consuming research facilities in the center of the campus, especially when they serve few people, and when a central location for research means the dispersal of other facilities used in greater density.

Chart 3. Percent Distribution Expenditures for Separately Budgeted Research and Development in Colleges and UniversitiesProper, by Source of Support, Fiscal year 1958

TOTAL, $327.5 MILLION

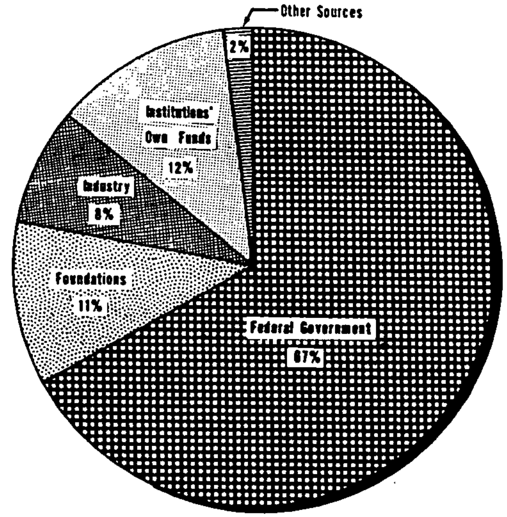
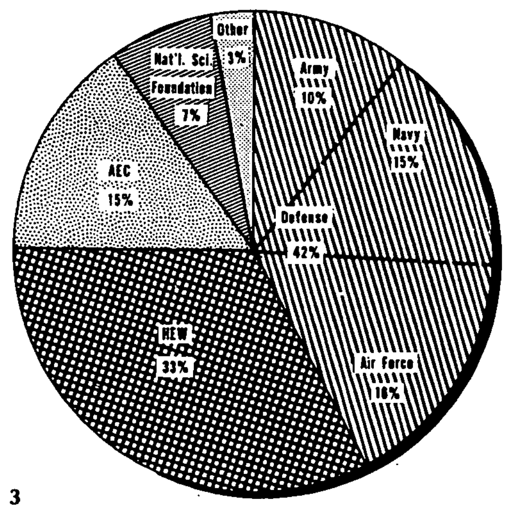


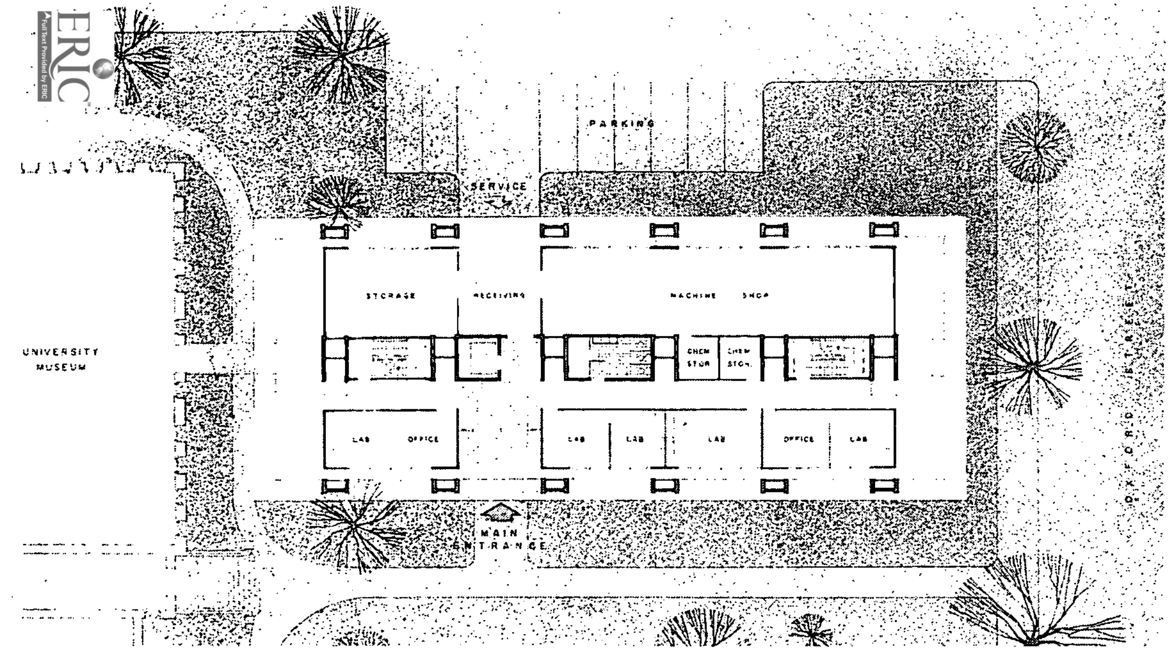
Chart 4. Percent Distribution of Federal Expenditures for Separately Budgeted Research and Development in Colleges and Universities Proper, by Agency, Fiscal Year 1958.

FEDERAL SOURCES - $217.9 MILLION

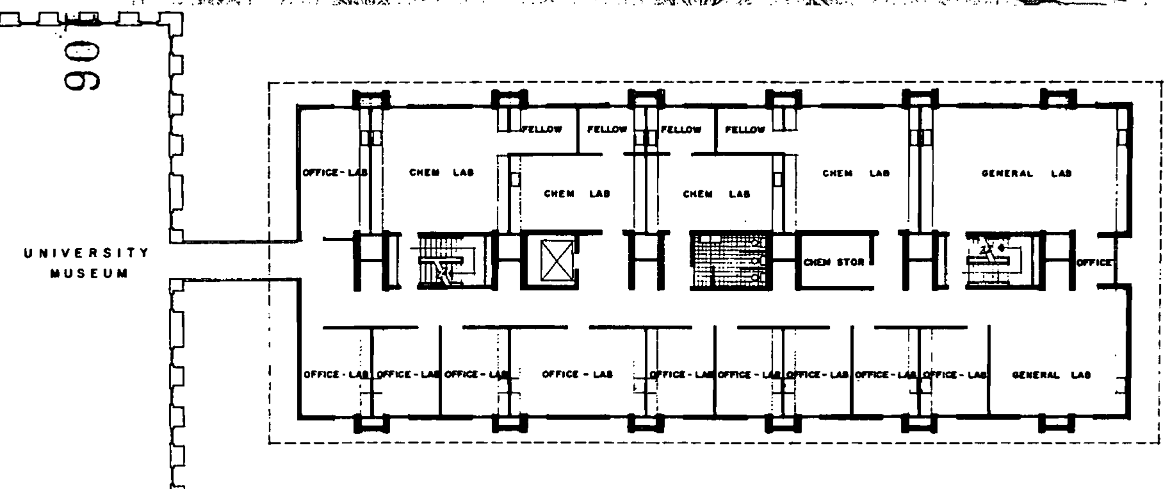


3
Source and distribution of Research Funds
at Colleges and Universities in 1958. (Last available year of analytic budget data.)
REPRODUCED BY COURTESY OF THE NATIONAL SCIENCE FOUNDATION

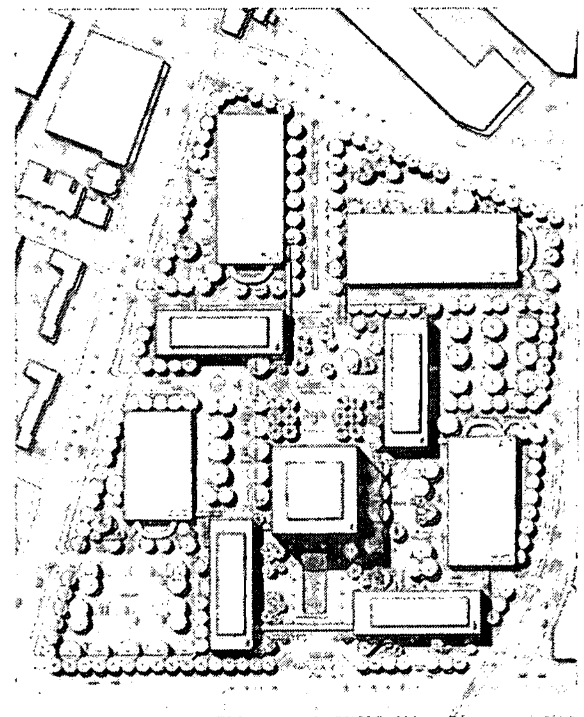
105



4A



4B



4, A, B
Harvard University, Laboratory Facilities (1962)
For Research in Experimental Geology
The Architects Collaborative
John C. Harkness, Partner-in-Charge
Actually a wing attached to University Museum (which contains the departmental library and specimen displays), this four story structure is designed for long-range interior flexibility as a center for advanced graduate and faculty research in the geologic sciences.

4A
Ground floor plan.
Storage and heavy uses are kept to the service side of the building. Main entrance faces a pleasant lawn framed by the Museum and new laboratory.

4B
Typical floor plan.
Laboratories and offices are arranged around the perimeter of the building; interior space serves as storage and service core. Problem of utilities was solved by placing major pipes, vents and other elements in vertical channels which were incorporated in the structure of the building. Flexible panels allow for easy interior modifications. Fourth floor is presently roofed, but open, and will accommodate expansion.

5
Technology Square (1961), Cambridge, Massachusetts
A Joint Project of Massachusetts Institute of Technology and Cabot, Cabot and Forbes
Architectural Consultant: Eduardo Catalano
Site Consultants: Sasaki, Walker and Associates, Inc.
Advantageously located near M.I.T., the land was assembled through urban renewal and by private purchase. Shown above, preliminary scheme for the five buildings which will be included in this private research center. Buildings are organized around a central plaza. 1700 automobiles will be sheltered in garages, another 300 cars parked on grade.

PROGRAMMING AND PLANNING MODULES

Begin by dividing types of research by activity, and program each type individually.

1. Research related to instruction

a. Research by individuals in pursuit of knowledge for its own sake. These needs will continue to be accommodated informally in faculty offices, libraries, museums, and even in the "basement."

b. Research connected with the institution's role of teaching. Here, traditionally, the building programs for instructional facilities will be used to accommodate this function. In schools fortunate enough to have the money to build centers of related subject areas, special floors or wings could bet set between buildings for work which crosses departmental lines. Students and teachers in each department could easily come together. This type of research has been described in Chapter 2 of this section, and programming and planning standards are listed on page 73. Despite the logic of segregation of facilities according to use, size, intensity of use and relationship to the teaching function, there will be many exceptions to these rules. Inconvenience, rapid obsolescence and constant change may simply have to be accepted as the price for keeping research and teaching close together.

2. Contract research

Research carried out by the institution on a contract basis in which full and part-time faculty members participate or supervise the work. This probably represents the major segment today. If not compatible to the central campus area it would naturally be located in peripheral zones. Limited research which does not present physical hazards might be spot located in expendable and expandable buildings. The University Facilities Research Center has recently reported on this type of structure, and concludes that "there is no positive answer to fit all conditions, and each institution must solve its own problem in the most applicable way."[7]

The sharing of expensive research tools by institutions located close to one another is another emerging trend. A number of the giants such as Princeton, M.I.T., the University of California and the University of Colorado have set aside large areas for research facilities which cannot be accommodated in the center of the campus. In addition to its internal program requirements, research sectors should also be selected and developed with the intention of allowing fast and easy communication with the center of campus. It may be advisable to consider providing for teaching facilities in these off-campus buildings and to re-examine the school calendar and techniques of teaching to allow a portion of the program to take place at the remote research site.

Except for establishing research sectors with generous expansion possibilities, there are no known techniques for predicting how much land is required for research or for the establishment of planning modules, unless specific projects have been identified.

3. Sponsored research on campus

Research sponsored by the institution, but having no direct connection with the teaching program. There are over a thousand of these bureaus, institutes and groups in the United States which are set up on a permanent basis for continuing research programs under a distinctive and specific title. Since they tend to be permanent facilities and attract many off-campus visitors, they should be given a location close to the major campus circulation systems. There is little justification for giving them high priorities for central sites.

4. Sponsored research off campus

Research supervised by the institution but located off campus. Examples of these include oceanographic institutes and high-altitude observatories. By definition they do not present a problem on campus, and the site development must be considered on the basis of its own program.

5. Research attracted by the institution

Because institutions have become major centers of research, they have the power to attract other related activities. At first the relationship may be casual and perhaps even accidental. Later however, it may become a large enterprise, for campus and non-campus research is economically able to support a community of fabricators, suppliers and technicians. The proximity of basic research sources to applied research and development activities presents an economic asset that is inviting to private enterprise. The intellecutal attractions of the institution appeal to those engaged in work off campus. Thus through formal and informal contact, the bonds between campus and non-campus research are strengthened. This series of interrelationships may take physical form as special research centers are located close to the institution. Technology Square in Cambridge, and the research parks at Stanford, California are recent examples.

Estimating planning modules for such activities must be done on a project-to-project basis. In the future, special off-campus research centers are likely to emerge wherever individual large campuses have maturing academic programs in science and technology, or whenever groups of institutions are situated in close proximity to one another. Comprehensive planning can accommodate such activities at least as land uses, and the potential should be recognized in development planning.

FOOTNOTES

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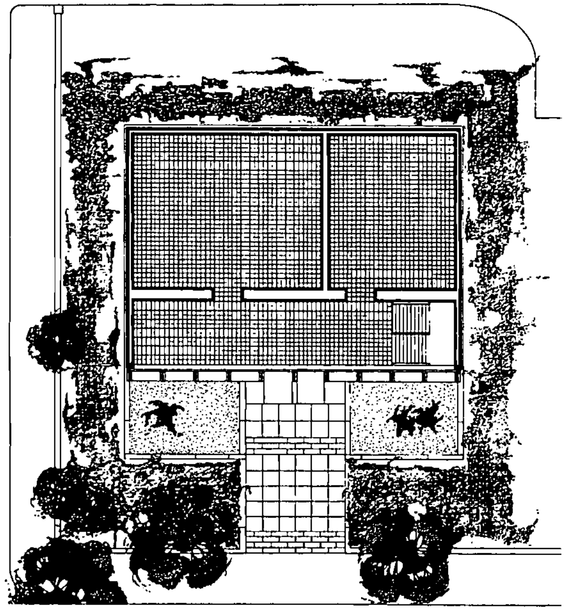
2. Adapted from "A Restudy Of The Needs Of California In Higher Education"; Sacramento; California State Department of Education; 1955.
3. *Ibid.*
4. *Ibid.*
5. The Association of American University Presses, Directory 1961-62.
6. "Stanford University Press"; Stanford University Press, Stanford, California, 1959.
7. Letter to the author.
8. Letter to the author.



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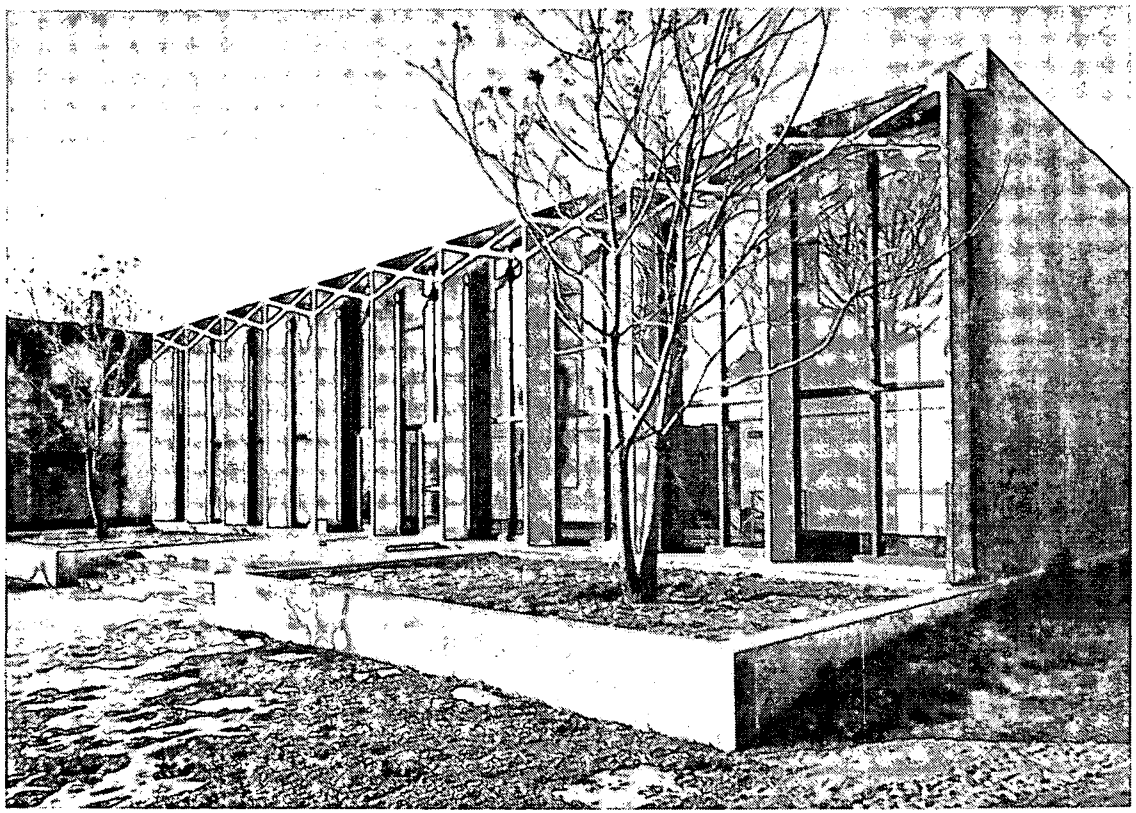
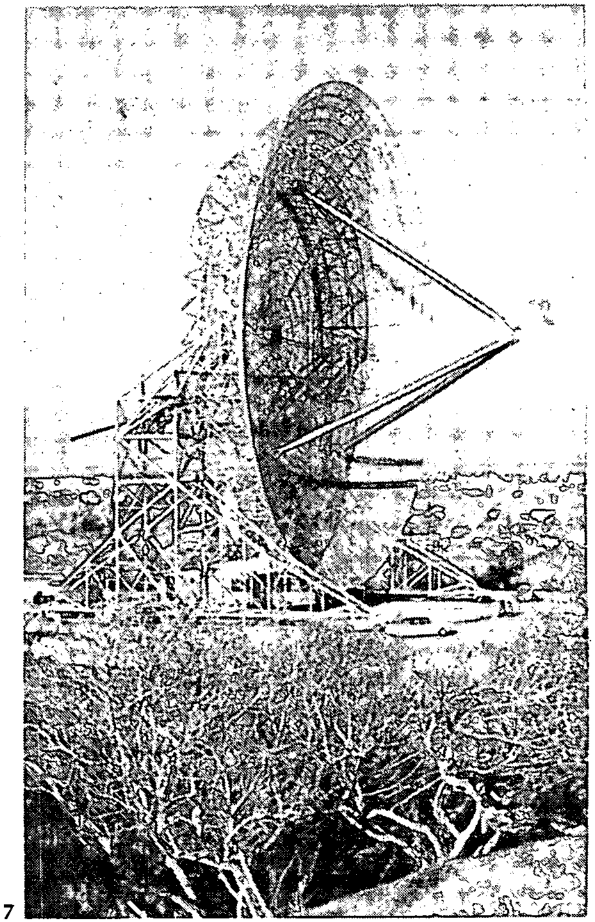


6B

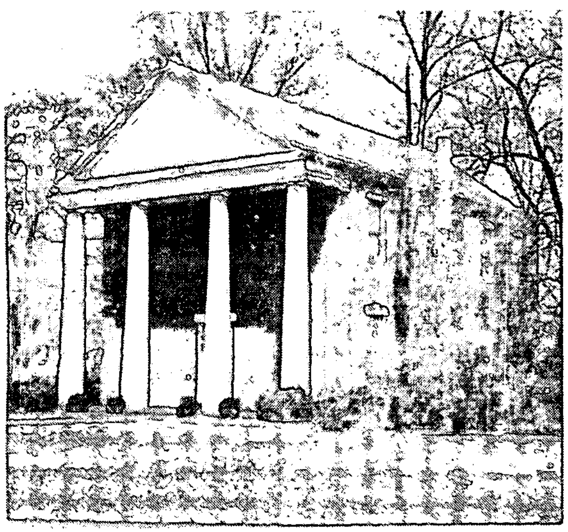


7

6A, B
Computing Center (1961), Brown University
Providence, Rhode Island
Architect: Phillip Johnson
The facility requirements for research do not always impose conditions that evoke an industrial scale of design. The utilitarian aspects of this basic research tool at Brown University were clothed in a highly sophisticated architectural mannerism, which marks the building as a special memorial. The use of red granite chips in the pre-cast concrete elements was intended to harmonize the center with its 19th century environs.
PHOTO: ALEXANDRE GEORGES

7
Research Tool Stanford University (1963)
The technology of contemporary research in the physical sciences has introduced a scale of design which is beyond architecture, one that poses special problems as to location and utility.
PHOTO: STANFORD UNIVERSITY PLANNING OFFICE

5. Centers of Extracurricular Life



Phi Kappa Hall (1836) University of Georgia
PHOTO COURTESY OF LIBRARY OF CONGRESS

CENTERS OF EXTRACURRICULAR LIFE

There are special non-instructional buildings on campus, important to the life of the academic community, having special design requirements and necessitating a central location of public prominence. These buildings are the centers of extracurricular life. Typical examples include:

1. College and university unions
2. Faculty clubs
3. Chapels and churches
4. Auditoriums and theatres

In varying degrees these centers have existed in some form throughout the history of higher American education. Compulsory chapel attendance was an integral part of life at the denominational college. Theatre, debating societies and musicales date back to the 1750's. Surviving buildings are among the best examples of the architecture of their time, such as the Phi Kappa Literary Society Hall (1836) at the University of Georgia, and Eumaneant and Philanthropic Halls (1849) at Davidson College. While student unions as a building type are less than a hundred years old, the functions they shelter were carried on either outside the college or in makeshift quarters. As an historian of the 18th century college wrote, the "boys met in one another's rooms, read poems, held learned conversations, and enjoyed some tobacco and beer."

Centers of extracurricular life tend to be memorial buildings constructed but once or twice a century. They usually represent considerable investment for special interior furnishings and equipment. Because of their specialized nature these buildings should be represented in the plan by modules based on preliminary architectural programs. Where such a program cannot be prepared, a square-footage-standard-per-user can help measure an appropriate module. At best such square footage standards are only approximations which will ensure the reservation of an adequate site, but not much more than that. However, once a reasonable site has been selected, then at least land use and circulations decisions can be made.

COLLEGE AND UNIVERSITY UNIONS

If libraries are the temples of learning, then student unions are the agorae and forums. Campus unions today serve the following functions:

1. The sale of goods and services, either as a convenience to the campus community or as a necessity (when the campus is too remote from local shopping centers).
2. Provision of facilities for supervised social activities and indoor recreation.
3. Provision of facilities for extra-curricular student activities and organizations, such as student publications, hobby groups, and political clubs.
4. On some campuses the student union may serve as the central dining hall, achieving economies by combining several kinds of food operations under one roof, particularly when there is insufficient volume to support or warrant such functions individually.
5. On the denominational campuses, because they are centrally located facilities, student unions are also convenient places for chapels, which are sometimes constructed as a wing to the student union.

The offices of the deans of men and women can be advantageously located in the student union, close to the pulse of student life. Institutions with large enrollments may have several buildings devoted to the purposes which are embodied in a single building on a smaller campus.

The following individual activities were identified in twenty student union buildings constructed since 1950.

alumni offices	cafeterias
art display areas	chapels
administrative offices	cigar and cigarette vendors stands
ballrooms	co-operative stores
banquet rooms	dining rooms
barber shops	faculty lounges
bookstores	game rooms
bowling alleys	

hotel rooms	reception rooms
information bureaus	rest rooms
libraries (browsing)	soda fountains
locker and check rooms	shoe shine parlors
music rooms	student organization offices
pool and billiard rooms	swimming pools
post offices	tailors
reading rooms	theatres
radio and tv stations	washrooms

In establishing planning modules for unions, it is best to work from a preliminary program of activities to be contained in the building. However, when this cannot be done, a simplified representative module can be made on the basis of the space standards of the state of California, Division of Higher Education:

1st 5,000 students	8 sq. ft. per student
2nd 5,000 students	7 sq. ft. per student
3rd 5,000 students	6 sq. ft. per student
over 15,000 students	5 sq. ft. per student

Three errors common in recent student union buildings have been:

1. Inadequate vertical circulation, due to placing heavy density uses on the upper floors.
2. Inadequate provision for expansion needs.
3. Inadequate vehicular servicing and parking areas.

Proper site selection can help reduce the risk of constructing an awkwardly designed building by reserving a site adequate for present and long-range needs. Because the union is a centrally located facility, reserving a site for expansion and parking is difficult, as many demands are made on land in the central campus.

Campus unions are excellent foreground buildings, and their special purpose affords the opportunity for a display of architectural dexterity. Outdoor spaces surrounding the student union building deserve equally elaborate treatment as they are likely to be the crossroads of the campus. The higher costs for special design effects may be justified on the basis of the income which attractive student unions can yield. In fact, on many public campuses, self-liquidating bonds rather than public appropriations, are used to build campus unions. Beyond the point of convenience, campus unions have to compete with off-campus recreation centers for a clientele. In some ways, good architecture and generously designed buildings and space are essential to bolster the economic support for the campus union.

2

Student Center, University of California, Berkeley
Donald Hardison and Vernon DeMars,
Associated Architects
Lawrence Halprin, Landscape Architect

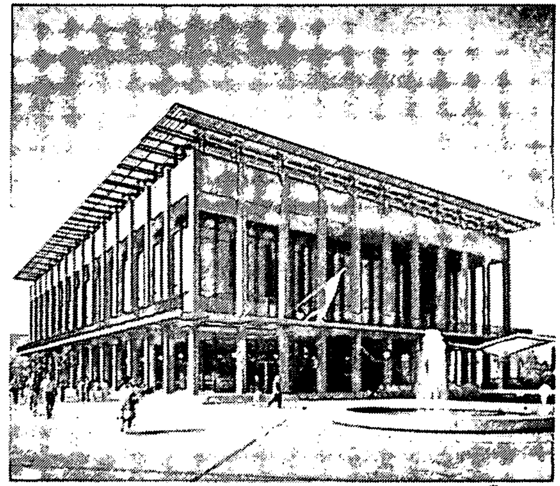
Commons Building completed 1960
Union Building completed 1961
Office Building—to be completed 1963
Auditorium and Theatre—to be completed 1964

The four buildings and related open-spaces constitute a major landmark in American college and university architecture. The designers have cleverly sited their composition at a central juncture of town and campus so that existing campus buildings and adjacent off campus activities (shopping and professional services) can be pulled together into a rational land-use area. The result is an urban center, with the town uses reinforcing the gown uses.

As a center for 30,000 students plus faculty and staff, the center is treated as an urban place. The architecture and landscape, and the elements of industrial design which permeate both, reflect an atmosphere that is urbane and alive with the excitement of a core area. The effect is neither 20th century colonial nor the relaxed atmosphere of a hilltop college, but rather a unique design in the tradition of urban centers in Western civilization.

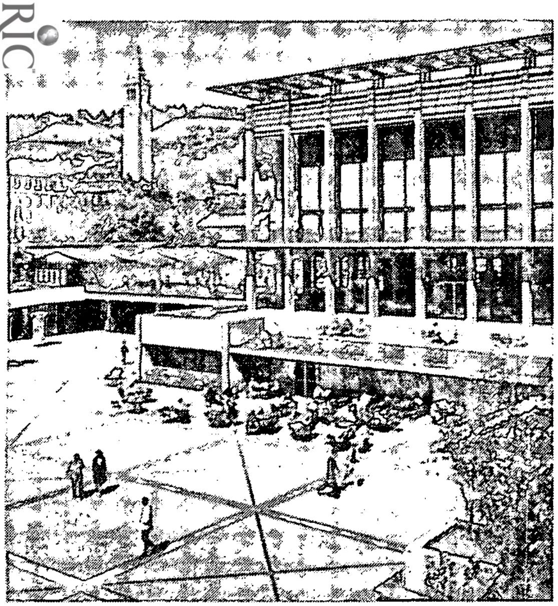
The scale of the buildings is deliberately reduced to human dimensions by introducing great variety in all aspects of the site development—unity may have resulted in monumentality.

The variety comes about by using changes in levels, by mixing large and small interior and exterior open spaces (for example, the breaking down of the large dining area in the commons into smaller functional spaces), by siting the individual buildings on ground planes which are treated dissimilarly and by avoiding long axial vistas. Finally the composition respects existing traditions on campus by framing one side of the important mall that connects the entrance to the old campus (Sather Gate) with the area beyond. Existing campus landmarks are used as design foils, in that glimpses and views of the existing architecture visibly connect the new center and the older sections of the campus.



2A

2A
View of Union Building
PHOTO: MORLEY BAER
2B
View of interior spaces of Union Building and Commons
PHOTO: MORLEY BAER
DRAWING: UNIVERSITY OF CALIFORNIA
2C
Floor plans
ILLUSTRATIONS: COURTESY OF THE ARCHITECTS
2D
Model
PHOTO: ASUC PHOTOGRAPHY



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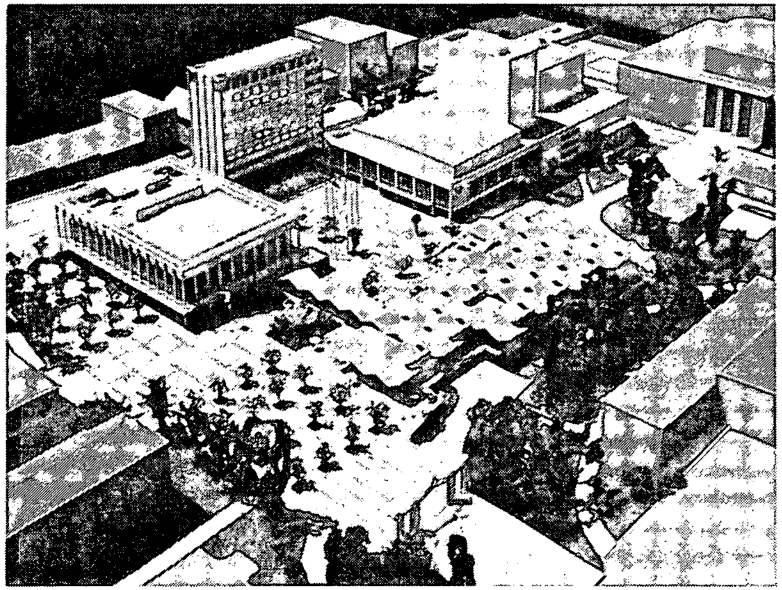

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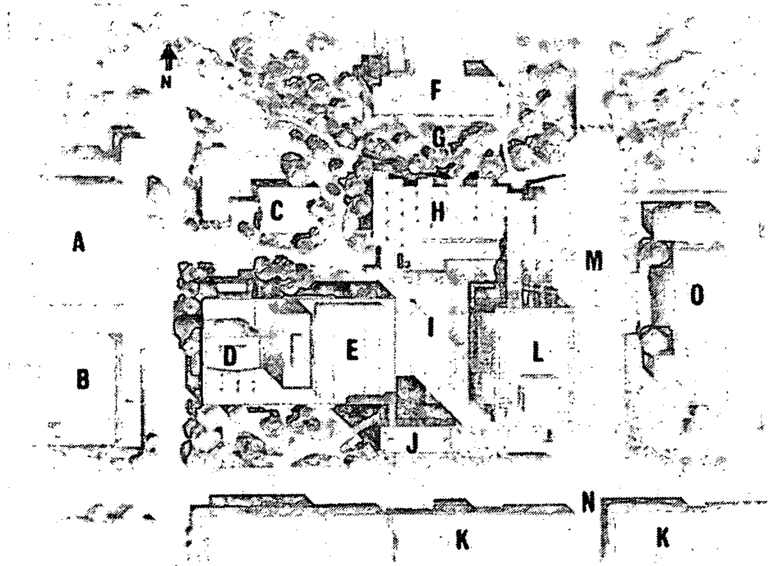
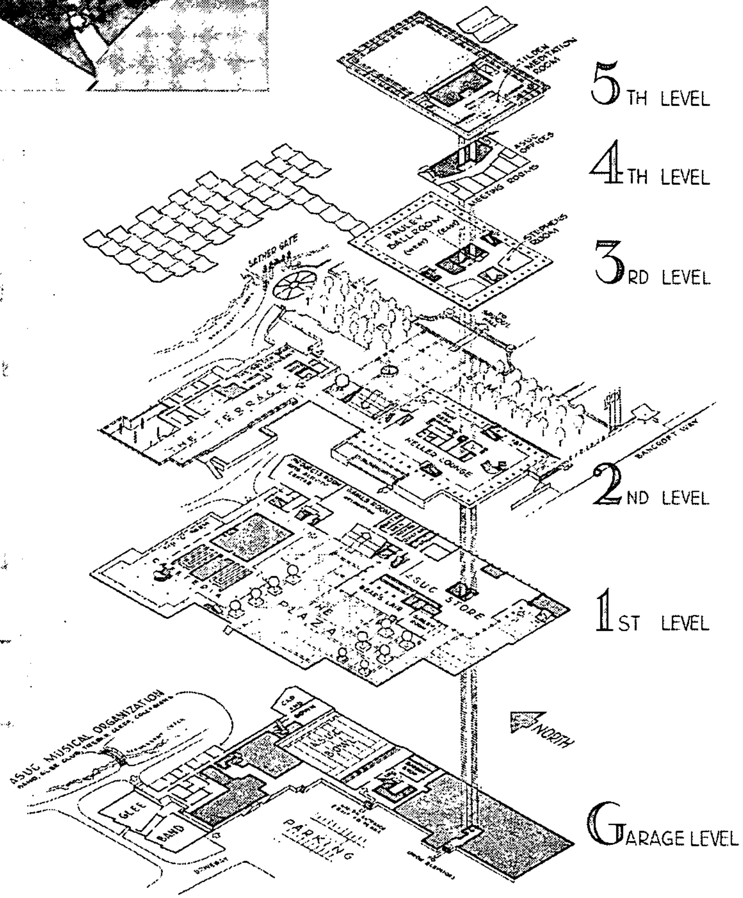


2E
Site Plan
PHOTO: JERNER PHOTO
A. Men's Gymnasium
B. Swimming Pool
C. "Alumni House"
D. The Little Theater
E. The University Auditorium
F. Academic Classroom Building
G. Strawberry Creek
H. Dining Commons
I. Student Center Plaza (Parking under.)
J. Student Center Office Building
K. Commercial (Shops, etc.)
L. Student Union
M. Student Center Mall
N. Main Student Shopping Street
O. Sproul Hall Administration Building



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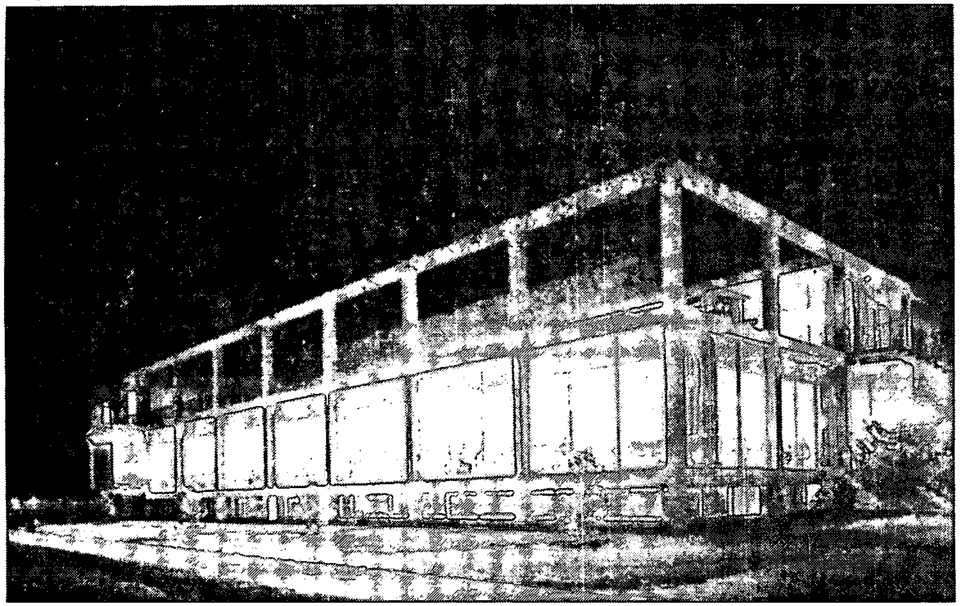
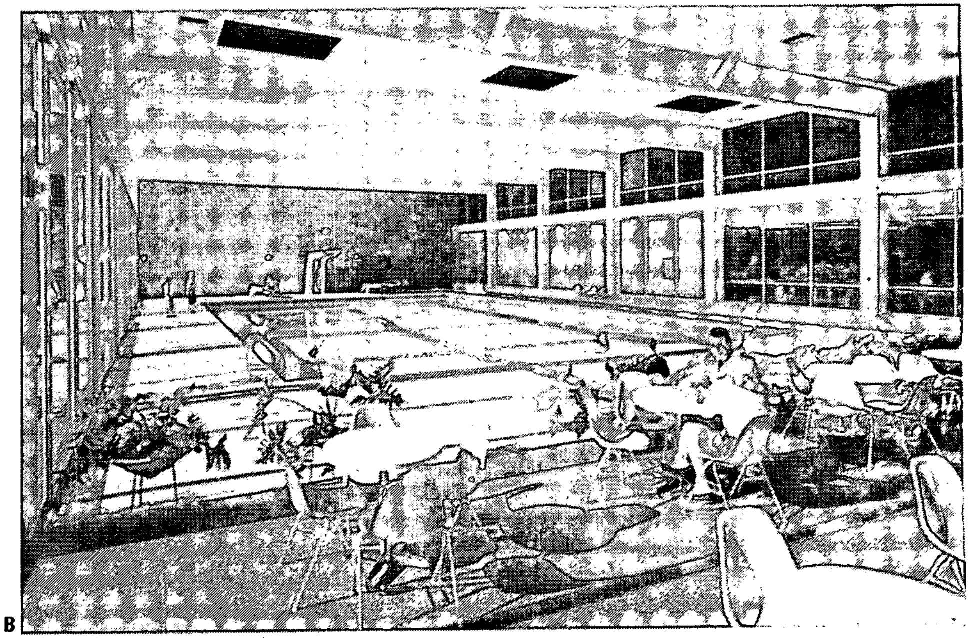


3A



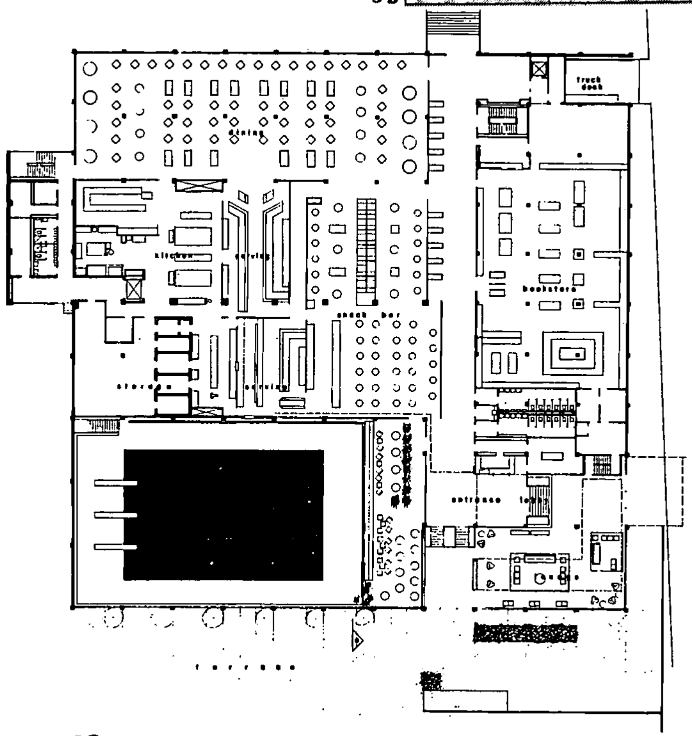
3B

3A, B, C, D

Student Center, Tulane University (1959)
New Orleans, Louisiana
Architects: Curtis & Davis, Edward B. Silverstein

Located near the existing library and gymnasium, this facility completes the core area in the University plan. Like many union buildings the Student Center at Tulane must shelter many different activities under one roof. A single building, using a split-level type plan, made it possible to place all public lounges near the main control desk on the first floor. Activities are zoned so that it is seldom necessary to walk up or down more than one flight of stairs.

PHOTOS BY: FRANK L. MILLER



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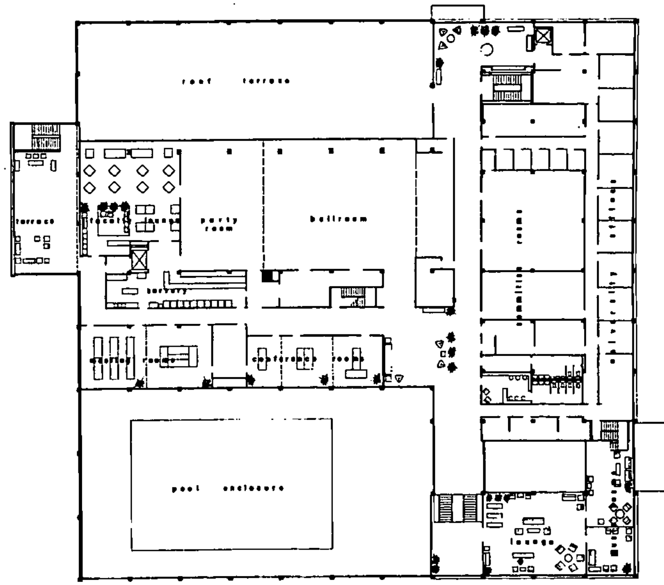
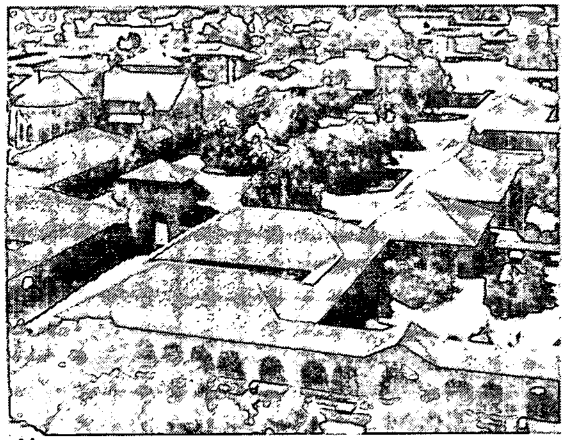


3D



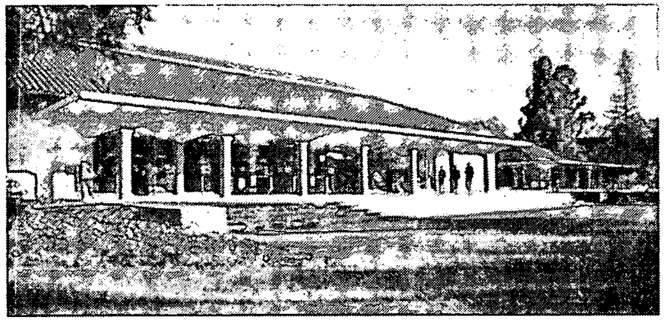
4A

4

Stanford University Bookstore and Postoffice (1960)
Architect: John Carl Warnecke & Associates

The design expression of the Stanford campus was established in the early quadrangles developed by Shepley, Rutan and Coolidge. The new bookstore and postoffice intelligently provided design continuity, though precast vaulted forms were used in place of the older rusticated stone. The use of red tile roofs and a continuation of the University's tradition of using arcades helped meld together new and old. The bookstore and postoffice constitute the first phase construction of what eventually will be a nine building student activity center located in the heart of the campus.

AIRVIEW: STANFORD UNIVERSITY PLANNING OFFICE
FACADE, INTERIOR, NEW WALKS: ROGER STURTEVANT



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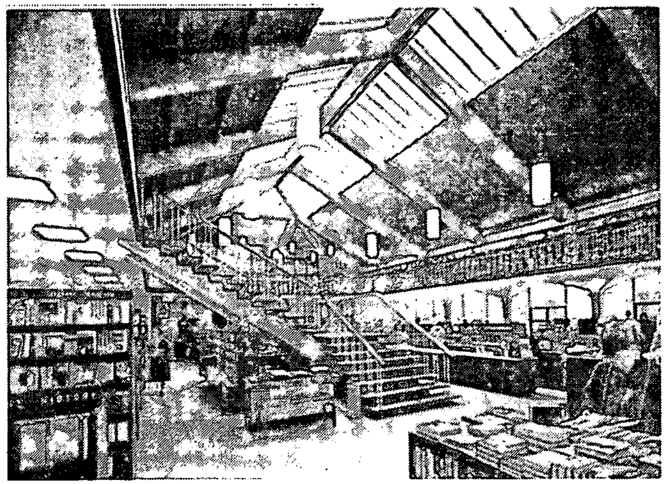

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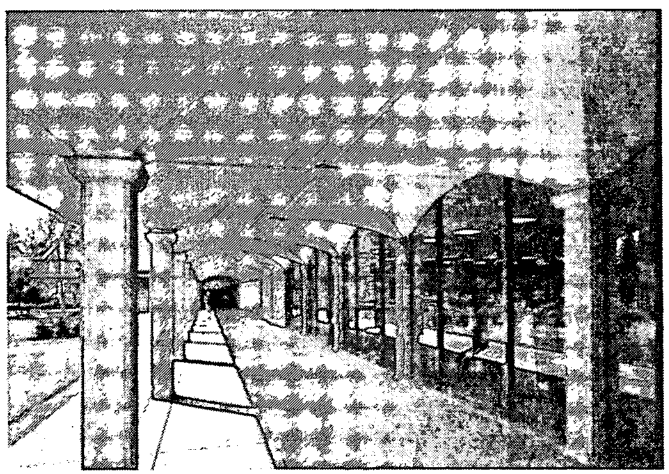
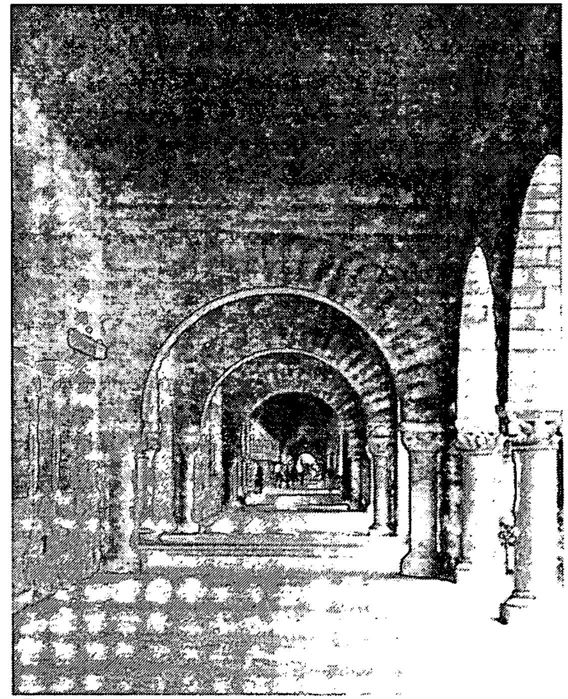


4E



4D

4A
Air View
4B
Facade
4C
Interior
4D
Old Walks
4E
New Walks

FACULTY CLUB

The faculty club is not a casual appendage to the physical plan, but serves an important function as an instrument for intellectual communication.

"It is increasingly apparent in the world of knowledge that cross-fertilization between allied and even diverse areas is a very stimulating and productive thing.

The Quadrangle Club at the University of Chicago created a situation where a chemist sat next to a physicist, and a physicist sat next to an Egyptologist, and inevitably they both talked and listened. The results have been far more productive than any tinkering with university organization, or any kind of forced association that the university administration might dream up. Professor Libby's Carbon 14 dating process came about through a random discussion between him and an Egyptologist at the Quadrangle Club."

(A FACULTY CLUB FOR STANFORD, 1962.)

A true community of scholars requires a place for facilitating staff acquaintances as institutions grow larger. In addition, the club serves as a place where members can easily come for meals or coffee; to hold formal or informal meetings, to entertain friends, or simply to pause between classes.

Typical facilities would include a large dining room and several smaller ones, food preparation and serving areas, lounges, rest rooms, a reading room, game room, and possibly several transient accommodations for visiting guests. For a planning module, allocate 30 square feet per faculty member, up to 500 faculty and 5 square feet per faculty beyond that number.

THEATRES AND AUDITORIUMS

The theatre and auditorium functions are two-fold:

1. To provide a convenient place for large group assembly; for instruction, testing, meetings, display and presentation of information and visual materials.
2. To provide facilities for the teaching, participation and enjoyment of the performing arts: music, theatre, dance, elocution and others.

Many schools manage by using the gymnasium, chapel or dining hall for these functions; but the technical deficiencies of poor sightlines, uncomfortable seating arrangements, impediments in scheduling, and the lack of proper equipment are hard to overcome and eventually special facilities become desirable.

Current trends in programming and planning are:

1. Colleges and universities are constructing lecture halls with various seating capacities as part of the instructional facility requirements, but at the same time include in the program for design, equipment and furniture suitable for public lectures and meetings. By creating a number of rooms with different seating capacities, a wider range of extra-curricular activities can be carried on, since no one facility has to be tightly scheduled.
2. Institutions are combining theatre and auditorium functions into one facility, providing a hall with a large seating capacity, along with several smaller halls for experimental theatre, instruction and rehearsal rooms. Meetings, lectures and other activities which are not likely to fill the larger hall can be assigned to the smaller facility.
3. Elaborate facilities for the performing arts — in effect, professional theatres, have been recently opened.

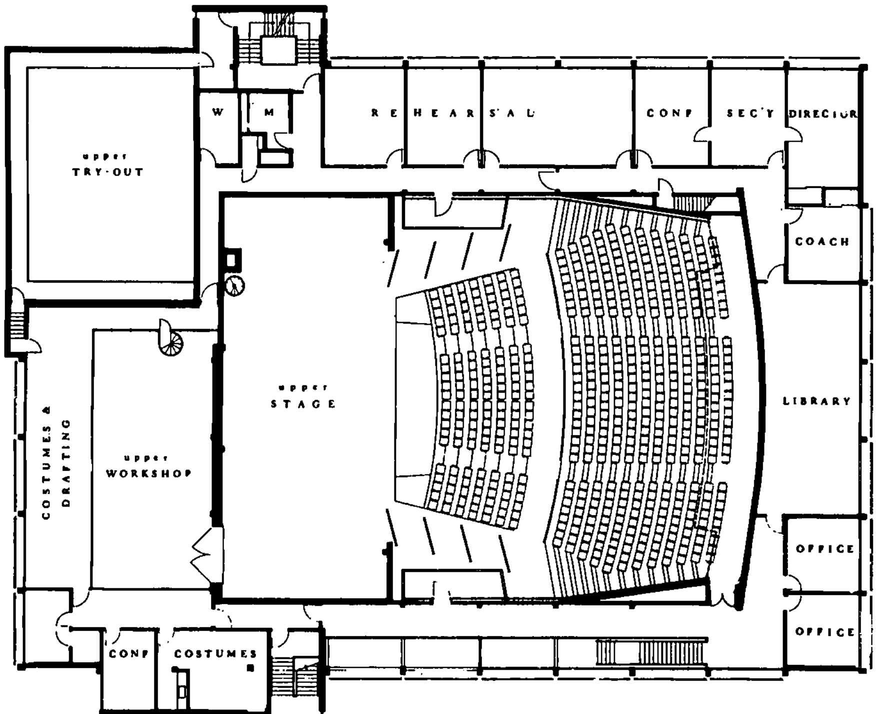
Some institutions rent auditoriums and theatres to off-campus groups when they are not being used by the school. This is done partly to pay for overhead such as maintenance and heating expenses that have to be carried on no matter who is using the hall.

Opening the facilities to community-wide use also brings town and gown closer together, making for good public relations. The location of facilities that might be jointly used by community and campus requires sites that are convenient to both groups and larger parking areas generally than those needed for campus use alone.

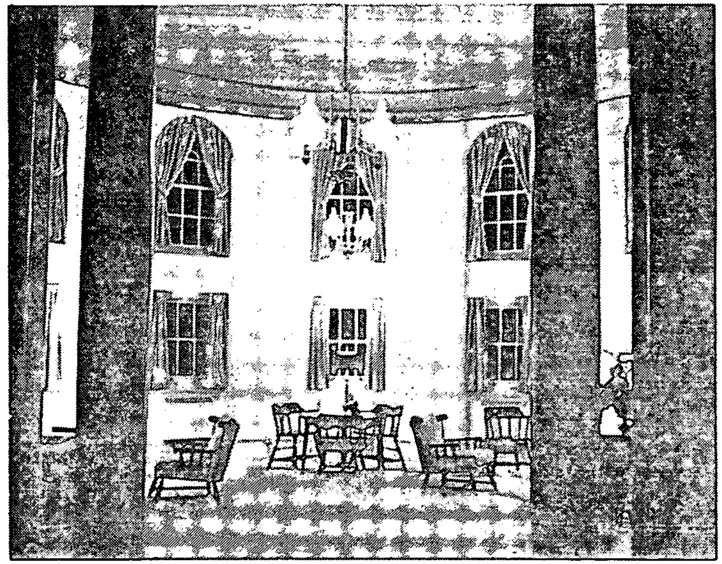
5A, B
Loeb Drama Center, Harvard University (1960)
Architect: Hugh Stubbins & Associates

Exterior and first floor plan of an undergraduate facility designed to encourage the performing arts.
PHOTO: MOLITOR

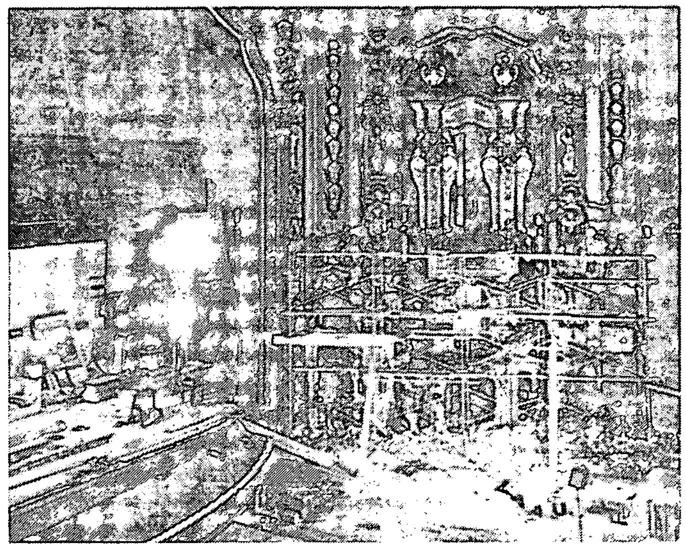
5A



5B



6A



6B

6

Occasionally economic renovations can shelter new functions in old spaces.

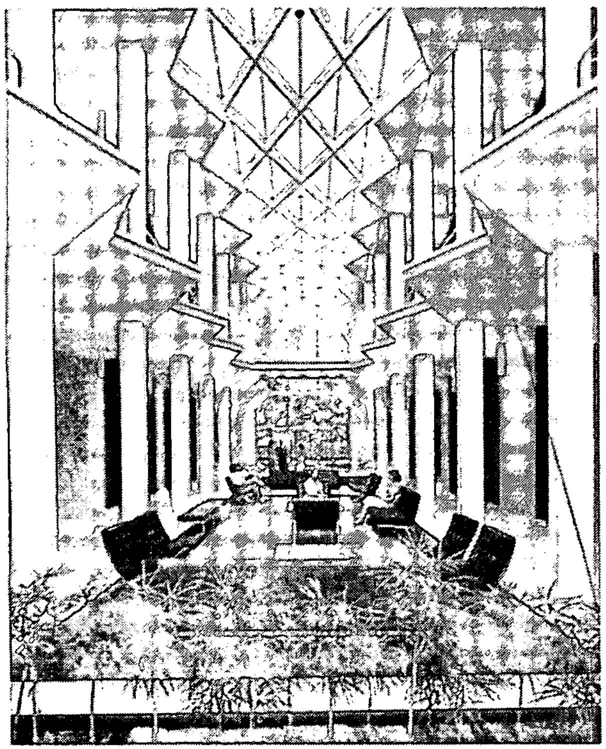
6A

Student lounge Lebanon Valley College (1959). Converted from a library.

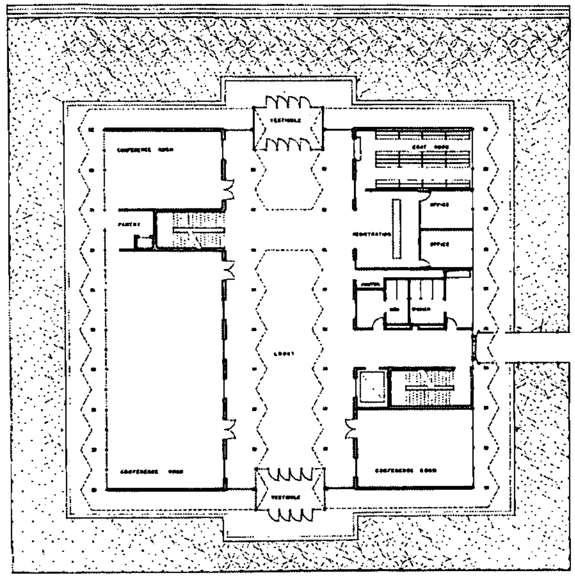
6B

Construction photo (1962) of $500,000 renovation of Brooklyn Paramount Movie theatre into a multi-use building for Long Island University.

PHOTOS COURTESY OF THE INSTITUTIONS



7A



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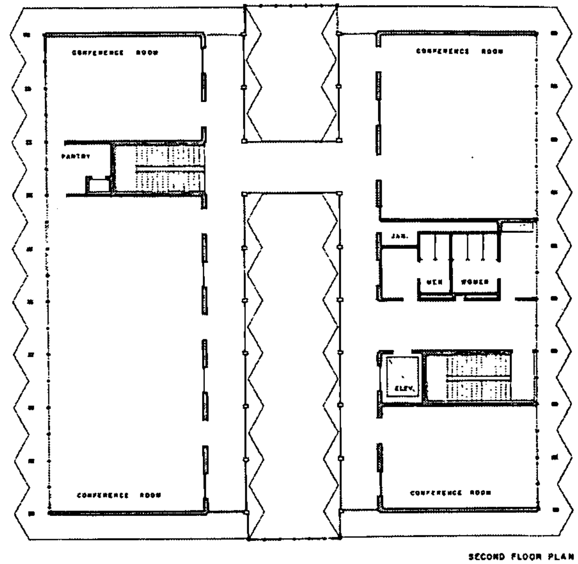


7C

7A, B, C, D

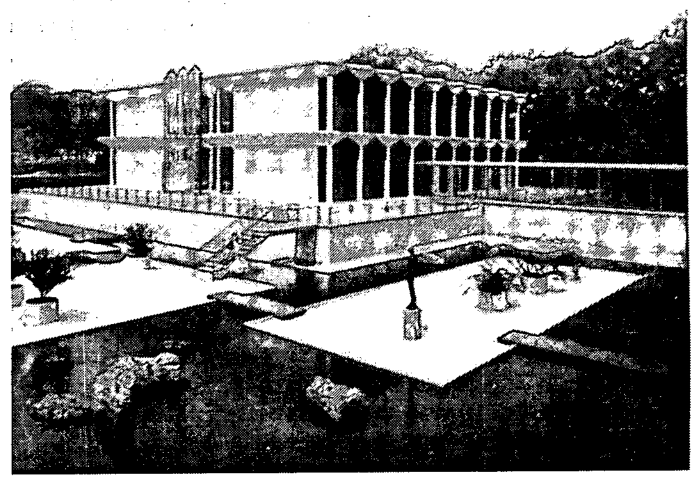
McGregor Community Conference Center (1958)
Wayne State University
Detroit, Michigan
Architect: Minoru Yamasaki and Associates
Landscape Architects: Eichstedt-Johnson Associates

This is an excellent example of foreground architecture. As a memorial to the donors and as a significant link between the University and the community, the richness of the building detail and site design express the symbolic importance of the structure.

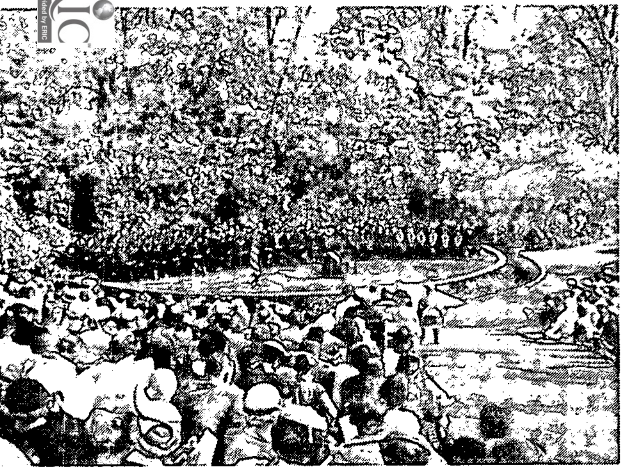
The building is used by public and institutional groups as a conference center, in conjunction with an auditorium and exhibit hall to the east (see site plan and photo of the glassed connecting passageway.)

Galleries, bordering a skylighted lounge, lead to various conference rooms. Coat rooms and registration desk are on the first floor. Food service is provided from pantries on each floor; all rooms can be subdivided by folding partitions.

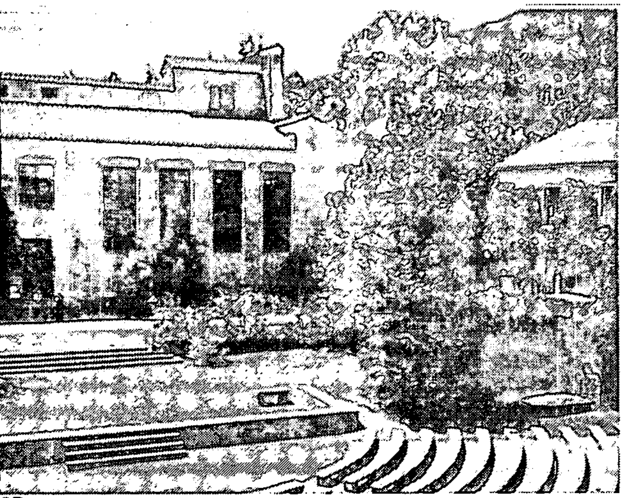
PHOTOS BY: BALTAZAR KORAB



7D



8A



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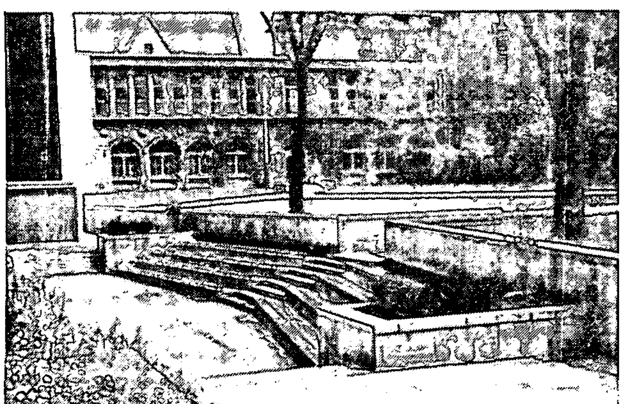


8C

8A

Outdoor amphitheatre, Whitman College
Walla Walla, Washington
PHOTO BY: W. T. LILLY

Natural dells and man-made amphitheatres can serve as outdoor auditoriums and meeting places.

8B

Mary Rippon Theatre, University of Colorado
Designed by Charles Z. Klauder
PHOTO BY: U. OF COLORADO

8C

University of Chicago

9A

Faculty Club courtyard (1960)
University of Southern California
Landscape Architect: Eckbo, Dean and Williams
PHOTO COURTESY: LANDSCAPE ARCHITECTS

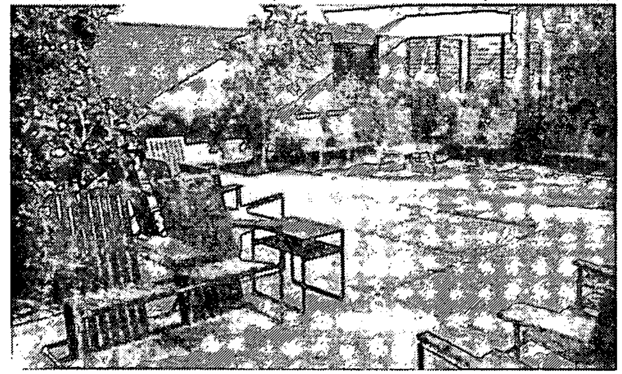
9B

Outdoor courtyard (1959)
Social Science Building
Arizona State University
Architect: Ralph Haver & Associates
PHOTO BY: ARIZONA STATE UNIVERSITY NEWS BUREAU

10

Quincy House, Harvard University (1961)
Plazas, terraces, courtyards, quadrangles, malls all can be designed as informal centers of extracurricular life.

Architects: Shepley, Bulfinch, Richardson and Abbott
Landscape Architects: Sasaki, Walker & Associates, Inc.
PHOTO BY: GOTTSCHO-SCHLEISNER



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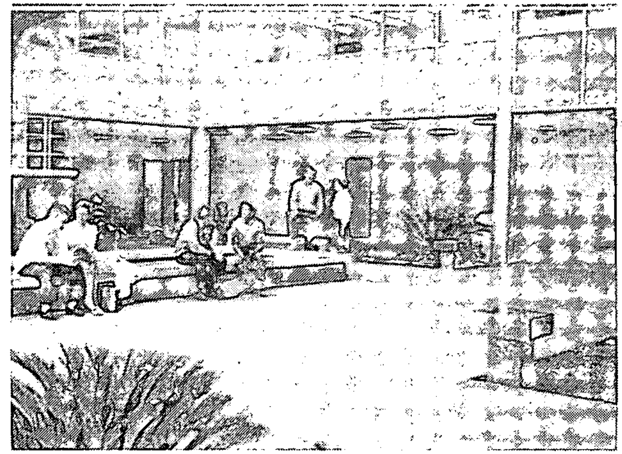
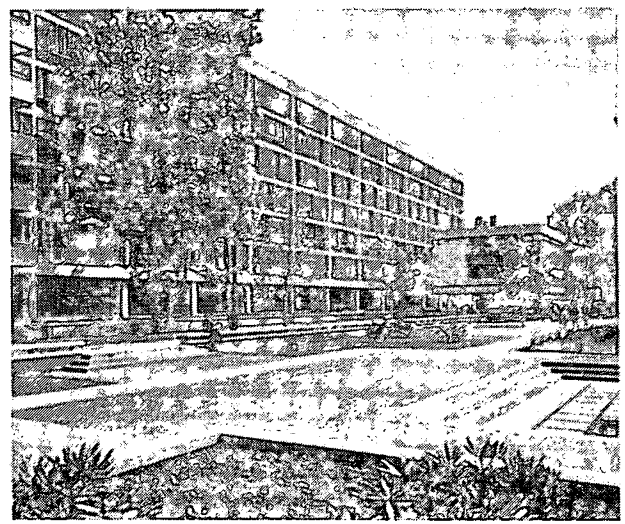


9B



10

CHURCHES, CHAPELS AND RELATED SPACES

Religious interests played an important role in the spread of higher education in the United States. A great many private colleges and universities still maintain strong denominational ties. The increased number of publicly supported institutions, however, has lowered the percentage of campuses having direct connections with any faith, since the Constitution maintains the separation of church and state. But on both public and private campuses, some provision is made for religious activities. At public institutions this usually takes the form of office space for chaplains and student religious organizations. On the private denominational campus the chapel is a dominant building.

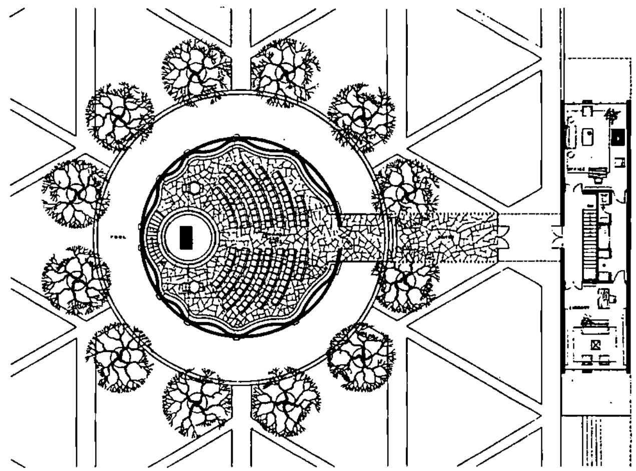
Religious buildings on campus fall into four categories:

1. Buildings constructed as part of a divinity school.
2. Buildings providing accommodations for religious orders that may teach or operate on the campus.
3. Buildings used solely for worship — either. non-denominational or multi-denominational, or buildings designed especially for the ceremonial needs of a single religion.
4. Buildings designed for worship, but also used for other purposes such as an auditorium, large lecture hall, or concert hall.

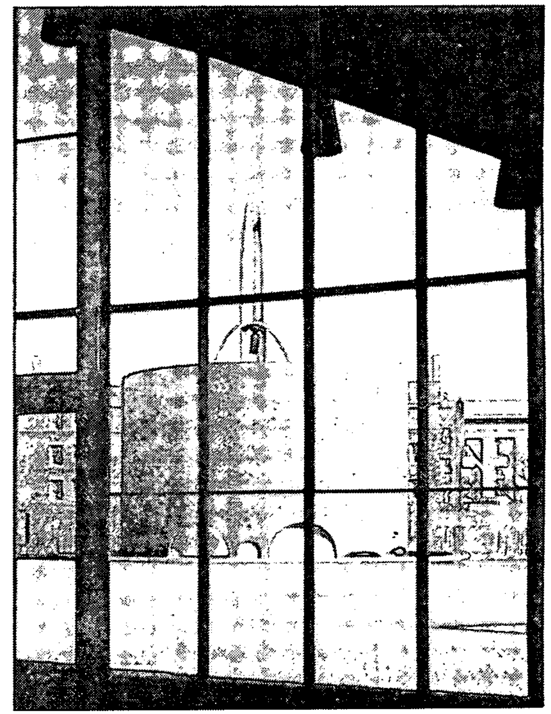
For the first category, planning modules can be adapted from instructional space standards listed in Chapter 2. For the second category a residential planning module approximating graduate student facilities will serve in those instances where local standards cannot be established.

Buildings for worship may be based on a square foot per person seated, or about ten square feet. This will include sufficient space for ceremonial rooms associated with a chapel or synagogue. Additional space for offices and other rooms should be added on the basis of preliminary architectural programs or discussions with campus officials.

At the larger public institutions religious groups maintain their facilities off campus. The location of such buildings does not usually fall within the province of the campus planner, except as he may influence local zoning and land-use ordinances as part of his liaison with the community at large. On campus space for the chaplains may be in the student union. The amount of space required does not necessitate detailed consideration in overall campus planning.



11A



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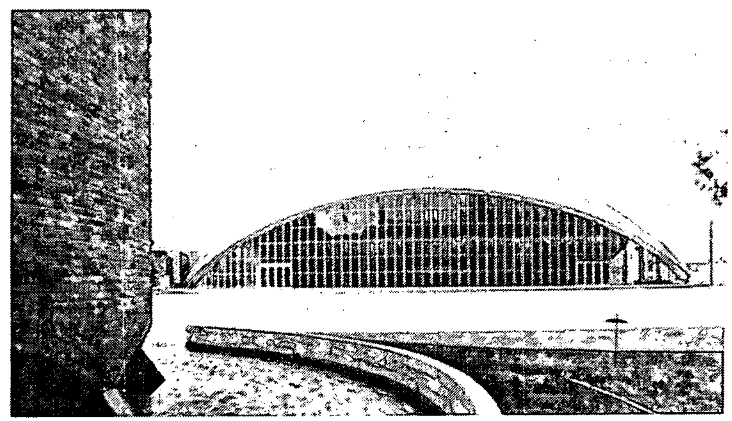

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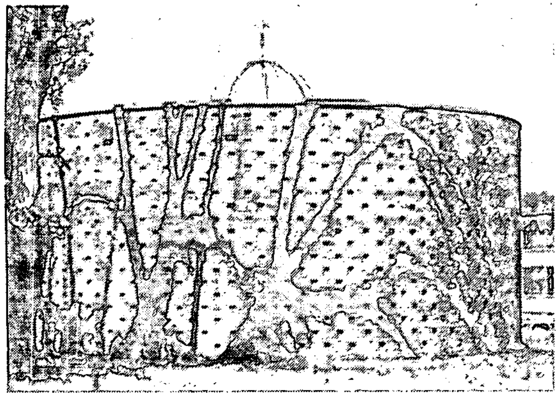

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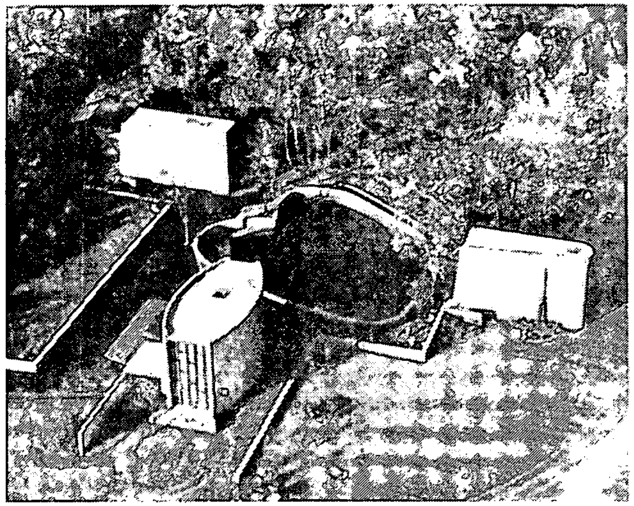

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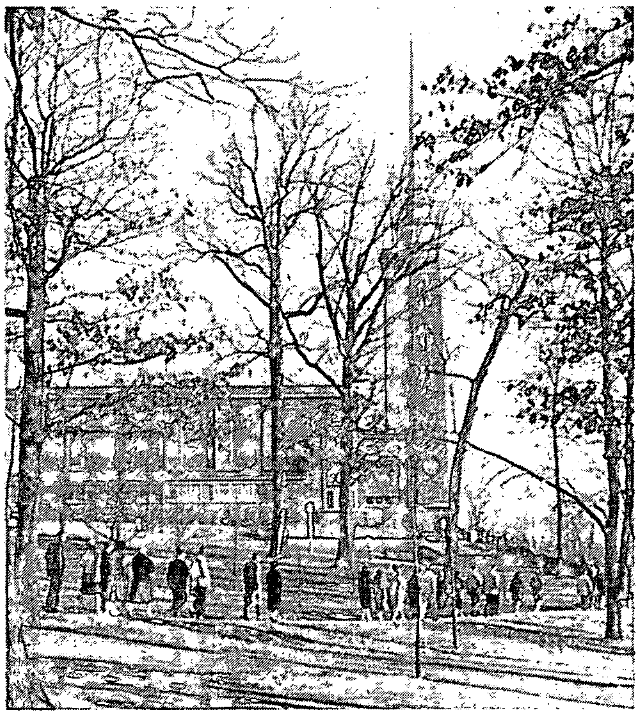

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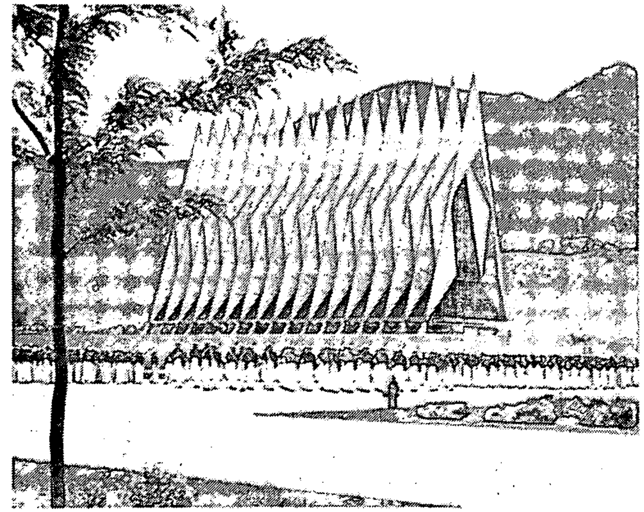
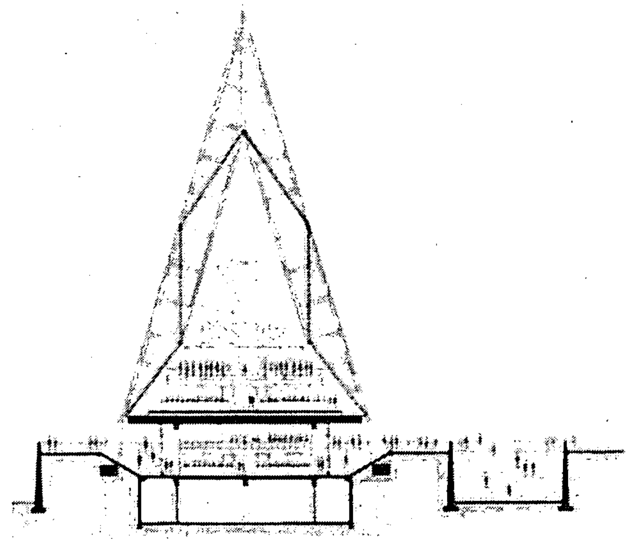
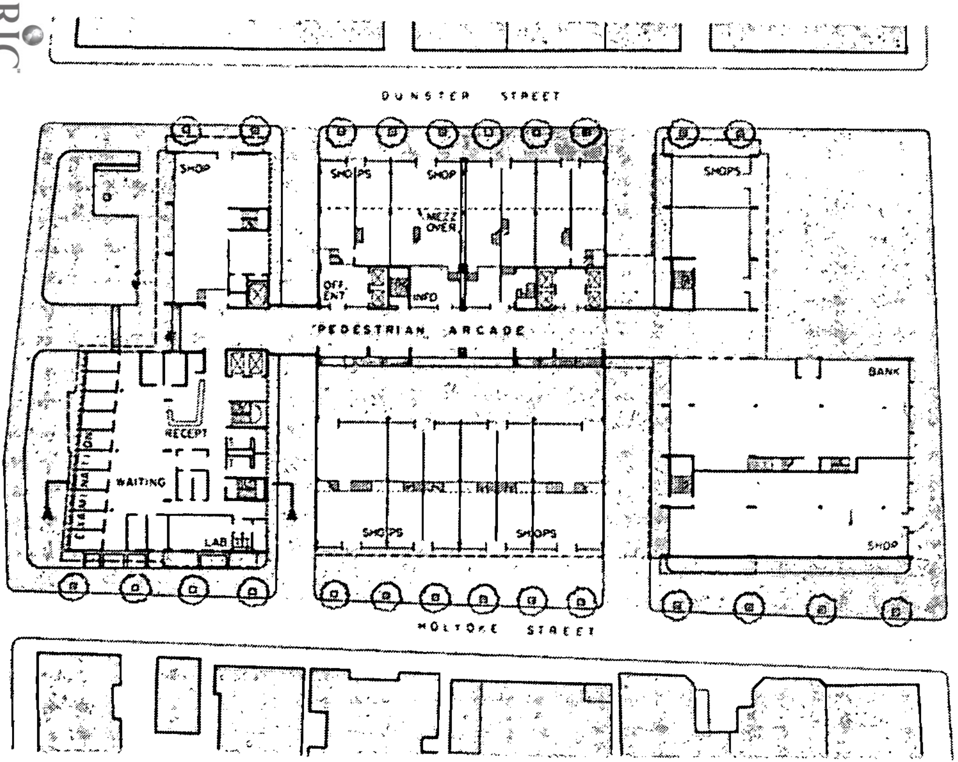


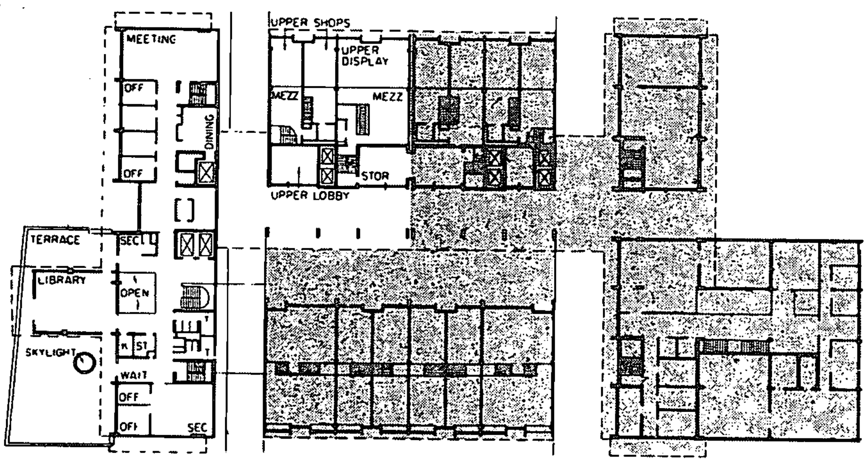


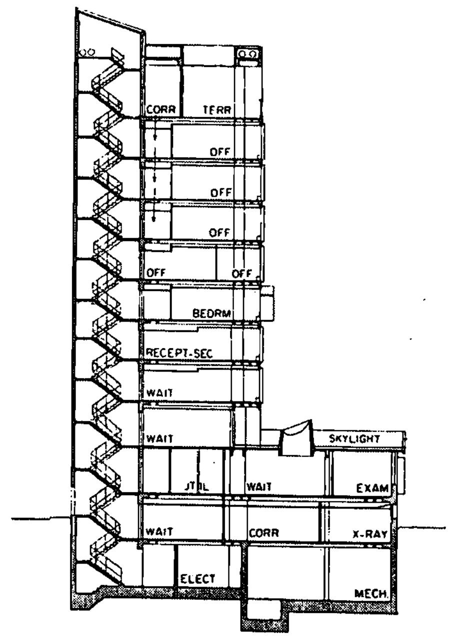
15

119

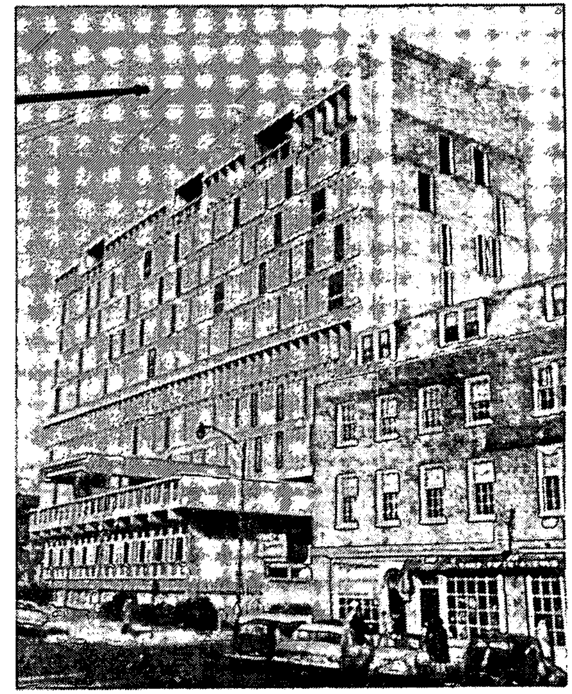
11A
Plan of Chapel, M.I.T. (1958)
Architect: Eero Saarinen & Associates
Associated Architects: Anderson, Beckwith and Haible
118
Chapel, M.I.T.
11C
Auditorium, M.I.T.
12
Chapel, Drake University
Architect: Eero Saarinen & Associates
PHOTO BY: WARREN REYNOLDS
13
Brandeis University Chapels (1955)
Architects: Harrison & Abramovitz
14
Wittenberg University (1955)
Combined Chapel and Library
Architect: T. Norman Mansell
15
Chapel (1961) United States Air Force Academy
Skidmore, Owings & Merrill







1A



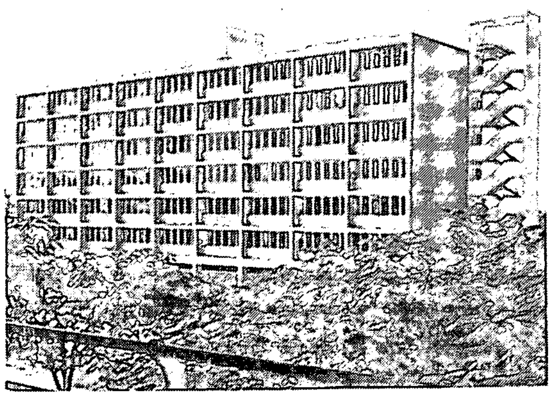
1A, B

Holyoke Center (1961)
Harvard University, Cambridge, Massachusetts
Architects: Sert, Jackson, and Gourley
Landscape Architects: Sasaki, Walker and Associates, Inc.

The development of the center for administrative offices, shops, and a health service for the entire university is planned in two stages. Stage one was opened in 1961. The completed wing is shown in the photo opposite, floor plans on the page following. The section now built houses five levels of hospital facilities, clinics and related medical offices. Above these, four floors of offices occupied by Harvard College, and on the penthouse floor meeting rooms with dining facilities. The eastern side of the building contains ground floor shops. The second half of the building will contain additional offices, meeting rooms, and commercial uses on the ground floor.

6. Institutional Services

Institutional services are day to day non-instructional activities which enable the college and university to carry out efficiently its obligations to faculty, student and staff, fulfilling the purposes for which the institutions were chartered. The kinds and amounts of such services provided on any campus will necessarily differ in each case due to the innumerable variations in administrative structure and educational goals.



2
University of Miami
Ashe Administration Building
Architect: Watson, Deutschman and Kruse

INSTITUTIONAL SERVICES

The following functions are typical on most campuses and can be planned for accordingly:

1. *Academic Affairs*. These include the over-all direction and coordination of instruction in liberal, technical, general and professional education; the encouragement of scholarship, research and creative activity; and the extension of all these programs in ways suitable to those not regularly enrolled at the institution. Generally, academic affairs are administered by the president and the academic deans.

2. *Student Affairs*. This activity relates to all services dealing with admission, counseling, testing, health, record keeping, placement, student aid and student personnel functions.

3. *Financial Operations*. This consists of the fiscal management of all business enterprises on campus, and the administration of such services as housing, dining facilities, printing plants, laundry and related items.

4. *Plant Operations*. This covers the operation and maintenance of the physical plant, and occasionally the supervision of new construction and physical plant improvements.

5. *Special Services*. These activities include the alumni office, planning and development office, intercollegiate athletics, public information office, university and college presses, contract research offices.

In magnitude these non-instructional services comprise almost two thirds of the yearly current expenditures at the average college and university (see Table 9—Expenditures as Percentages). The scope of this enterprise is impressive. In 1957-58 college and university business officers paid out over $5.5 billion, $1.0 billion of which went for additions to the physical plant and the remainder going for goods, services and supplies, salaries and wages.

HISTORICAL TRENDS

In the beginning, instructional and administrative duties were combined in one person, but the increased scope of campus activities led to specialization. At small New England liberal arts colleges in the fifty years preceding the 1930 depression, the ratio of non-academic personnel to students dropped from 1:57 to 1:21; during the same period the teacher to student ratio remained constant at 1:11. A selection of college catalogs in 1883 showed that 17 per cent of the titles cited were for non-instructional personnel; by 1933 this percentage had doubled.[1]

The amount of space devoted to administration may continue to grow in the future, because of:

1. Growth in the average size of the institutions of higher learning and a proportionately greater rise in their non-current assets. (Table 10—Institutional Growth.)
2. Continuing enlargement of the scope of activities in higher education, including housing, extension services, contract research and publications.
3. Greater concern and better facilities for student health and welfare.
4. Development of sophisticated techniques in personnel and vocational guidance, and the widespread acceptance of their applicability and usefulness.
5. Greater demands on record keeping because of accreditation requirements, certification of students' achievement for professional and graduate schools, and increasing requests for students' performance records by employers.
6. Enlargement of the number of federal and state aid programs, and a corresponding need for specialized skills in interpreting, administering and keeping track of procedural directives and monies which accompany such aid.
7. Elaborate employee benefit programs for instructional and non-instructional staff.
8. Establishment of self-study groups and professional offices to guide the development of the campus, such as institutional research and campus planning offices. Though the ad-

ministration of these activities may become more efficient in the years ahead, it is unlikely that they will diminish in size or importance.

9. The increased competition among all colleges and universities for funds to expand their activities, resulting in greater attention to preparing and justifying budgets before state and local legislatures on the part of the public institutions; and more elaborate appeals to philanthropic sources by the private colleges and universities. All these studies require professional staffs.

Table 9: Expenditures as Percentages

General administration and general expenses	10.5
Instruction and departmental research	32.5
Libraries	2.4
Plant operation and maintenance	9.0
Services related to education and general services	5.3
Sales and services expenditures	.2
Organized research	16.2
Extension and public services	4.9
Auxiliary enterprises *(housing, dining facilities, etc.)*	17.1
Student-aid expenditures	2.9

(Source: Statistics of Higher Education 1957-58. Receipts, Expenditures, and Property. U. S. Department of Health, Education and Welfare; Washington, D.C. 1961. page 44.)

Table 10: Institutional Growth

DATE	AVERAGE ENROLLMENT PER INSTITUTION	AVERAGE NONCURRENT ASSETS PER INSTITUTION
1899-1900	250	$460,000
1945-46	600	–
1957-58	1,500	$8,700,000

Source: Ibid, p. 6

Table 11: General Administrative Space[2]

	SQUARE FEET PER STUDENT COLLEGE	SQUARE FEET PER STUDENT UNIVERSITY
1st 2,000 students	5.0	6.0
next 3,000 students	3.0	4.0
2d 5,000 students	2.5	3.0
3d 5,000 students	2.0	2.5
beyond 15,000 students	1.5	2.0

Table 12. Health Services for Residential Campuses[3]

	SQUARE FEET PER STUDENT
1st 2,000	4.0
next 3,000	3.0
second 5,000	2.5
3rd 5,000	2.0
beyond 15,000	1.5

Table 13. Health Services for Non-Residential Campuses[4]

	SQUARE FEET PER STUDENT
1st 2,000	1.0
next 3,000	0.9
second 5,000	0.8
third 5,000	0.7
beyond 15,000	0.6

PROGRAMMING AND PLANNING FOR FACILITIES

Considering all campuses as a group, the typical facilities for Institutional Services are:

1. Administrative office space.
2. Health service buildings.
3. Plant maintenance and operations buildings.
4. University and college presses and printing plants.

Programming and planning modules for all these facilities are best determined on the basis of local needs and operations. Where local standards cannot be easily determined, the rules of thumb below will be useful in establishing reasonable planning modules for administration and health buildings. The special nature of physical plant and maintenance buildings, along with university and college presses, makes it unlikely that any general rules will be pertinent to a particular situation. Planning modules for the latter type buildings are best established either after conferences with the appropriate campus officials or sometimes by preparing preliminary architectural programs.

ADMINISTRATIVE OFFICE SPACE

Estimate this space requirement on the basis of the number of F.T.E. students. Table 11 may be used in place of local standards:

There has been a tendency to place all general administrative services in a separate building, and to site it in a location which is central for students, faculty and visitors. Because they act as a bridge between the public and the campus administrative offices tend to be in the foreground, and their design, site location, and the treatment of the spaces in which they are situated reflect this importance. There is no clear evidence as to whether all such offices should be combined in one building. Institutions constantly change in various aspects of their operation. Executive and related functions are likely to be spread throughout the campus, wherever convenient. Dispersal of these functions may also help reduce the amount of parking required when all offices are placed in a single build-

g. Administrative services for students on campus can be advantageously located near the library or student union—in the middle of the heavy pedestrian flows. Those activities more public in nature are best located on a site with direct access to the major roads which surround the campus.

Administrative office space is a favorite use for structures which can no longer serve other purposes; this is a commendable move which may help preserve buildings of historic merit. Inconveniences usually experienced in rehabilitating such structures may be justified on grounds of historic preservation alone. However, as the administrative activities grow in size and the volume of people visiting the campus increases, the older buildings with their usual poor interior circulation will handicap efficient operations. In such cases offices attracting the greatest number of people—such as the registrar and bursar's office—may be placed in separate structures.

HEALTH SERVICES

For non-residential campuses, a suite of reception, examination, diagnosis, record keeping, treatment and related rooms comprises the typical health service facility. Tables 12 and 13 can be useful for estimating planning modules.

Residential campuses will need infirmary space, and the planning standards accordingly are higher. The infirmaries will have rooms for resident nurses and doctors, wards for contagious disease, private rooms and general wards. The larger infirmaries may also have surgical suites and related rooms.

PLANT MAINTENANCE AND OPERATIONS (P.M.O.)

These functions require such spaces as utility plants, incinerators, repair yards and shops, garages and storage rooms, locker room facilities for employees, offices for the administration, supervision and keeping of records related to these activities. Where P.M.&O. personnel prepare plans for campus construction, drafting and conference rooms will be included as part of the facility. Typically, the campus police and fire departments are located on land assigned to P.M.&O.

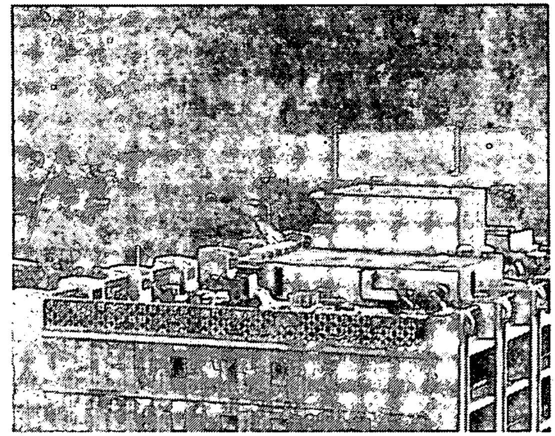
The kinds of facilities needed, both outdoor yards and enclosed buildings, will depend on the size of the school, its operating budget and, to a large extent, the density of development. Campuses with large acreage, for example, have greater need for road clearing and landscape maintenance equipment than do urban ones. Urban campuses may not need their own fire and police departments as they can purchase this protection, along with garbage and trash collection services, from the municipality in which they are situated. Non-urban campuses of any size usually have to furnish these services themselves.

There was a time when physical plant operations had to be located near the spur of a railroad line because coal was the major fuel used, and it proved convenient to group all related facilities around the boiler house. Major factors in locating facilities today are:

1. Physical plant operations and maintenance are assigned a low priority in choice of sites because higher priorities are given to academic, research and housing. This usually results in a peripheral location. If, however, the heating plant is a critical element in grouping of the buildings, then the location is modified by engineering limitations for transmitting steam, water and other utilities. The central heating plant may then be separated from the other plant maintenance and operation facilities and placed close to the central campus.
2. A peripheral site for P.M.&O. is justified on the basis of vehicular mobility. Work crews may be supervised and controlled through intra-campus communication systems. As a result, good access to major campus roads becomes the desirable and necessary requisite for site location.

In years past architects treated P.M.&O. buildings decoratively. Because of their utilitarian nature and hard use, there is a tendency today to dismiss these buildings as being of little importance. However, good site planning and design for P.M.&O. can do much to improve the appearance of the campus, increase efficiency, and add to employee moral.

The visual intrusion of clutter, which is associated with service areas, may also appear on the roofs of individual buildings. This problem is one which good architecture can overcome.



3A, B

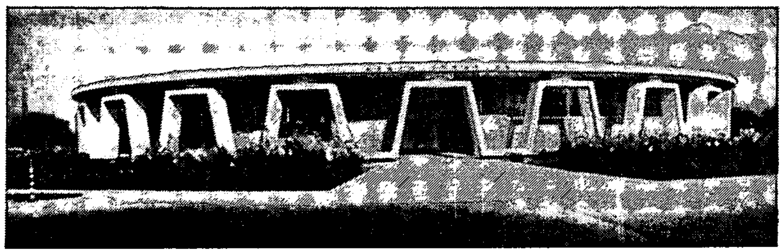
Administration Building (1959)
Lamar State College of Technology, Beaumont, Texas
Architects: Pitts, Mebane & Phelps

An unusual solution to an administration building, posing the problem of future expansion, but pleasantly enclosing a central court of no little charm.
PHOTOS: COURTESY OF THE ARCHITECT

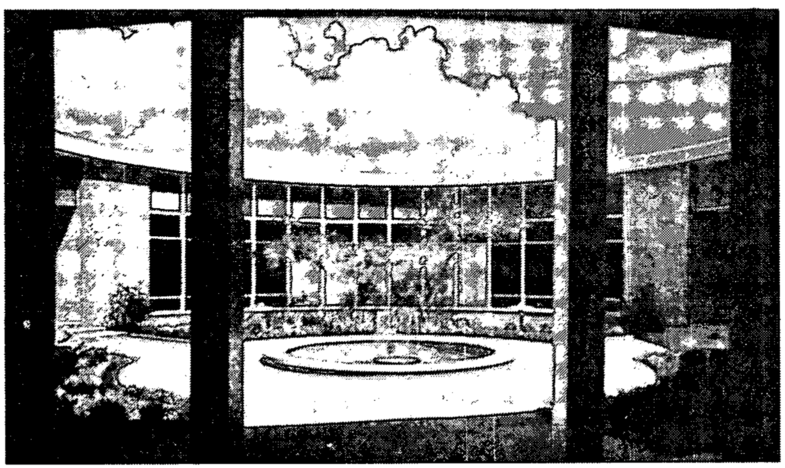
4A, B

Administration Building, University of South Florida
Pullara, Bowen & Watson, Architects (1959)

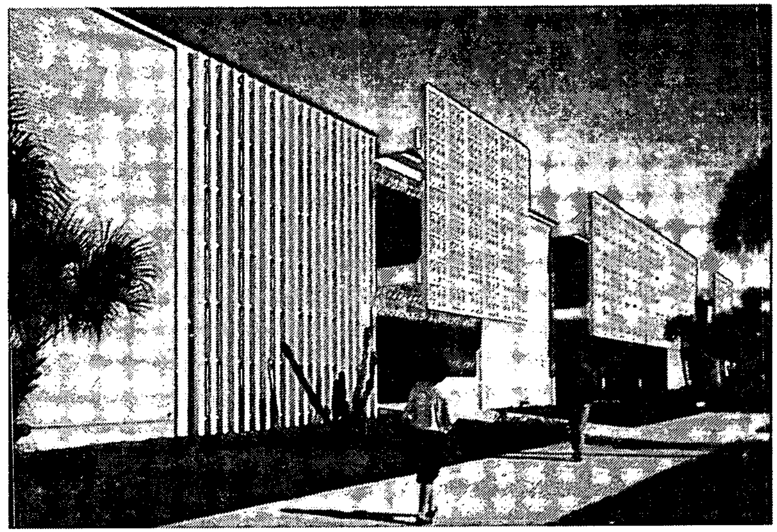
This building stands at the head of a long monumental approach to the campus. (See air view, page 306) Essentially a double loaded corridor wrapped around an open courtyard, the building eventually will serve as a gateway to the center of the campus—it can be entered from either the public or campus side. First floor offices are allocated for student services, including the registrar, deans of men and women, housing officer, student welfare secretary and the comptroller. The president, academic deans and other administrative officers are located on the second floor. Eighteen of the offices in the building are now being used for classrooms. Later when the University expands its teaching activities and a general classroom building is constructed, these rooms will become administrative offices.



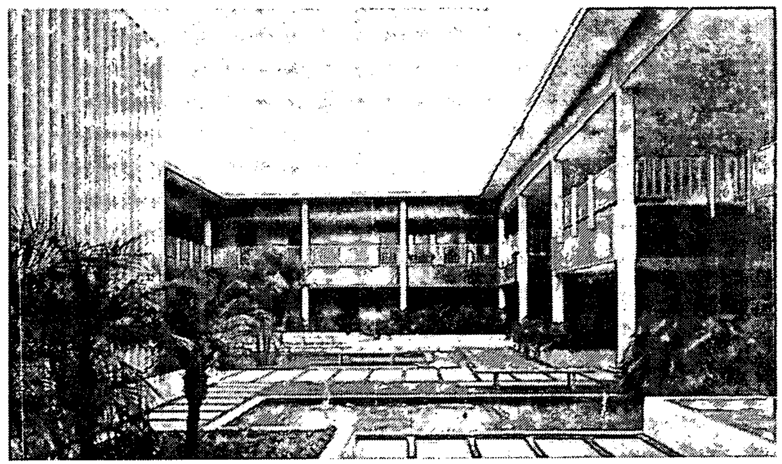
3A



3B



4A
View from plaza side of campus.



4B
Interior of courtyard.
PHOTOS BY: UNIVERSITY OF SOUTH FLORIDA NEWS BUREAU

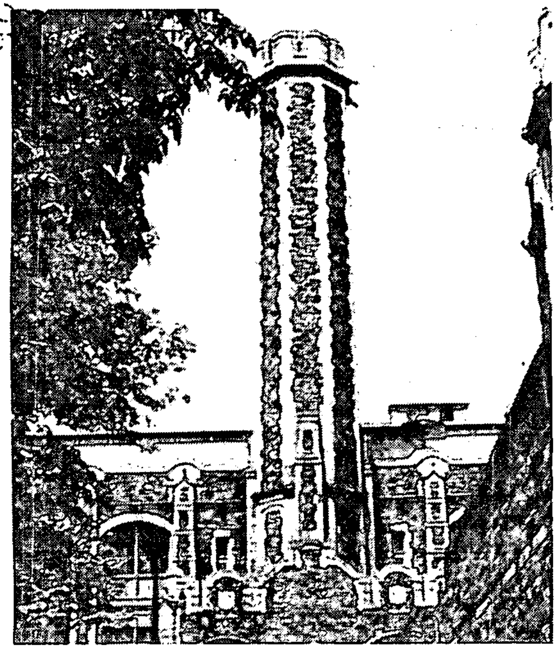
UNIVERSITY AND COLLEGE PRESSES AND PRINTING PLANTS

Three distinct but related activities fall within this category:

1. Book publishing
2. Book manufacture
3. Job printing.

There are 52 college and university presses in the United States.[5] In 1961 the presses published about 1600 new titles — more than ten per cent of the country's entire book output. Dollar volume in 1940 was approximately $1.0 million; in 1951 this had risen to $17 million. In proportion to the total physical plant, this function is small in size. But as an instrument in disseminating knowledge, which is one of the major tasks of the institution, college and university presses have a special importance.

Publishing and printing activities are likely to continue to grow at a rapid pace. Commercial publishing costs have risen considerably in the past two decades. University and college presses play a special role in handling scholarly and other works with limited circulation. This is made possible since college and university presses are nonprofit publishers. They do not have to take large risks to obtain a best seller that will pay for commercial "failures," and the presses have achieved a high degree of efficiency in the production of books with small editions.[6]



5
Mechanical Arts Building (1906)
City College of New York
Architect: George B. Post

Power plant combined as architecture with a teaching facility requiring space and structure for heavy machinery.

The number of job printing plants is not known, but printing operations are sufficiently common on most campuses to be considered in any long-range plan. Geographic location has much to do with the size of the printing venture. Campuses remote from the centers of manufacture find it convenient and economical to operate their own plants. The extent of the campus printing needs is also a factor, as it may be cheaper to buy printing services than to bear the expense of maintaining the service on campus. Because printing is a specialized industry, not all printers can do all jobs with equal efficiency. University and college plants tend to be quality shops and cannot cheaply produce certain types of third-rate, inexpensive printing which is occasionally required. Since it is not possible to adulterate first-class production techniques beyond a certain point, not all printing may be done on campus.

Printing facilities may occupy as little as 2,000 square feet. Combined printing and publishing ventures range in size from 25,000 square feet (University of Oklahoma) to 55,000 square feet (Stanford University Press). Space requirements for the larger plants include: editorial and design offices, administration offices, manufacturing plants, storage and warehouse facilities. One-story buildings are preferred in order to allow continuous manufacturing flow patterns.

Opinions are divided as to what constitutes the best location for printing operations. Some observers feel the closer the plant is to the customer, the better; others feel that "printers can do their best job when customers are not standing over their shoulders."[7] A location near, but not in, the central campus area is best. Service docks and adequate parking facilities are prime site requirements. If presses are located in central campus, it may be advisable for aesthetic reasons to screen out the manufacturing process, either architecturally or through landscape design.

Publishing activities, as opposed to printing functions, are best located close to the heart of the campus. Leon E. Seltzer, Director of the Stanford University Press, writes: ". . . this is vital, because a university press succeeds only in so far as it has both the confidence and the dedicated interests of the faculty. The press continuously ought to be in evidence to the faculty, for both its authors and advisors come from the faculty. It is difficult enough in any event for a press to achieve this identity with faculty concerns, and anything—such as distance from the academic complex — that contributes to this difficulty damages the development and growth of the press."[8]

FOOTNOTES

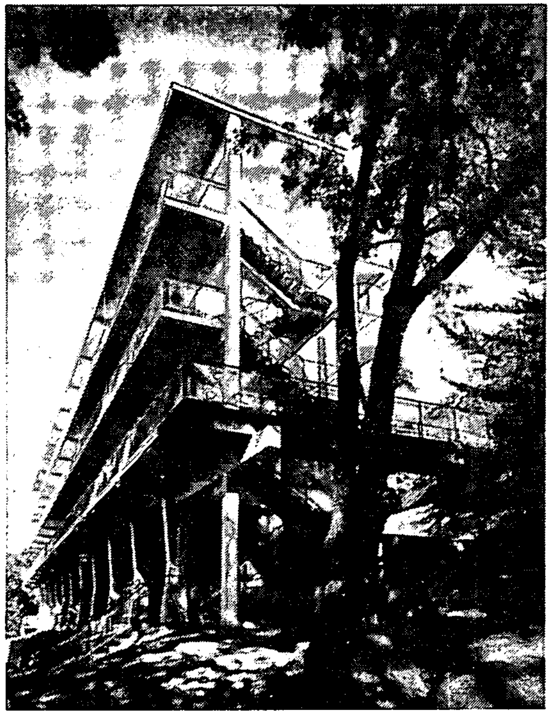
1. Brubacher, John S. and Rudy, Willis; "Higher Education In Transition"; New York; Harper and Brothers Publishers; 1958; p. 353.
2. Adapted from "A Restudy Of The Needs Of California In Higher Education"; Sacramento; California State Department of Education; 1955.
3. *Ibid.*
4. *Ibid.*
5. The Association of American University Presses, Directory 1961-62.
6. "Stanford University Press"; Stanford University Press, Stanford, California, 1959.
7. Letter to the author.
8. Letter to the author.

OTHER SOURCES

"Administration Of Higher Education, An Annotated Bibliography; Walter Crosby Eells and Ernest V. Hollis; Washington, D.C.; U.S. Department of Health, Education and Welfare; 1960.

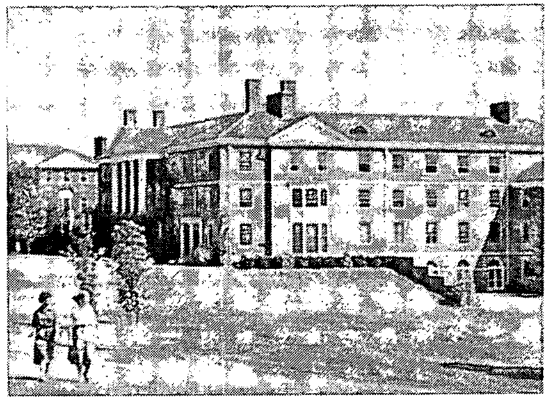
This bibliography is the most useful document extant for the activities covered in this chapter, containing over 2700 carefully selected references published between 1950 and 1959, or about 15 per cent of 20,000 articles that have appeared in print.

"Experience on numerous campuses has shown that the placing of men's and women's dormitories in close proximity to each other somehow tends to tame the savage male and to render him less brutish and more gentlemanly, more amenable to the niceties of life. We are therefore planning to do just that—arranging our new student housing so that the men's wing is joined by a common lounge to a women's wing, hopeful that the wings will produce harmony and peace." (A private college in a semi-rural area.)



1A

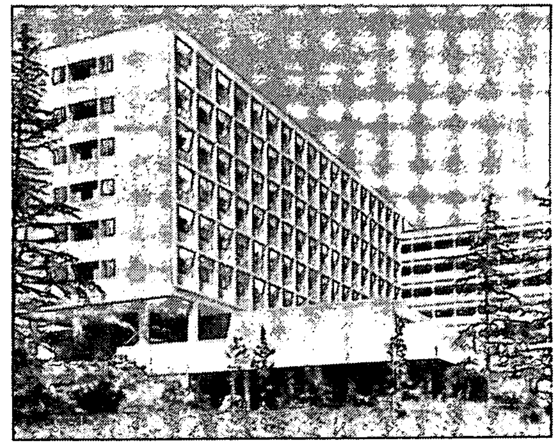
"To maintain the benefits of small classes, the preceptorial method of instruction, facilities for independent study and research, and the unity of campus life, the freshman class is limited to approximately 800 (male) unmarried students. Residence on campus is required, and enrollment is limited to those who will be full-time students in course for a bachelor's degree." (A large private university in a semi-rural area.)



1B

"The Plan includes provision for University and University associated housing in order to accomplish the goal of a University Undergraduate System, and to maintain a balanced and invigorating environment for learning. Toward these ends, the on-campus and near-campus neighborhood will take the form of increased undergraduate residence halls, graduate student dormitories and apartments, and faculty apartments and renovated housing." (A large, private urban university.)

'There is no clear evidence to date that Uni-'ersity-provided housing is desired by any ppreciable number of faculty members." (A arge mid-western state university.)



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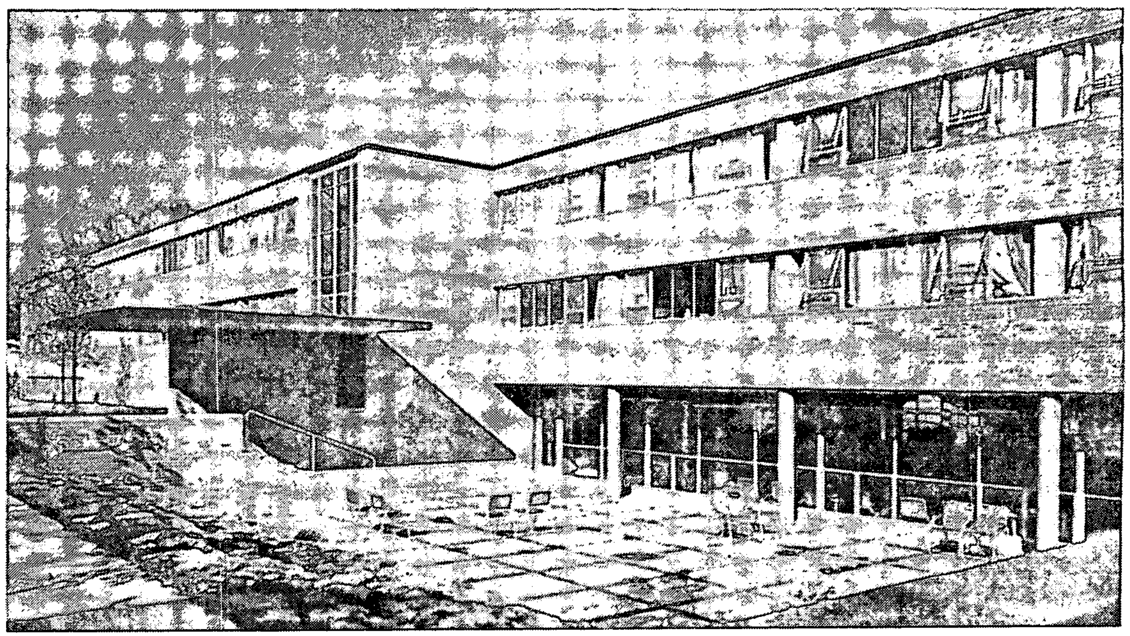


3

7. Housing

Not all colleges and universities have residential facilities. Among these institutions which do provide housing, the quality and quantity of construction and housing policies are as diverse and varied as are the concepts of American higher education itself.

Trends

In volume housing represents the largest single capital investment among various types of buildings on campus. Though not all institutions provide campus housing half the total of college and university buildings are devoted to this use. Housing policies and building types are as diverse as higher education itself. The central issues are not just those of quantity and quality; for the basic question as to whether or not institutions have an obligation to provide housing as part of their academic purpose is still debated, as it has been continuously for the last three hundred years. Among the colleges and universities furnishing housing, the major trends are:

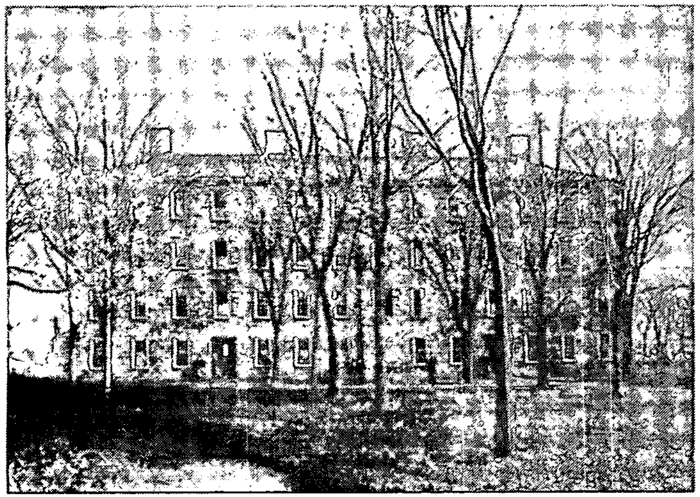
1. Expansion of the institution's role in housing to encompass all segments of the campus population, including graduate students, married students, faculty and staff, as well as the undergraduate body.
2. Diversity in types of accommodations on campus, including high-rise facilities, "villages" for married students; the mixture of male and female students on one site; cooperative housekeeping units; the enrichment of the undergraduate housing environment through the addition of interior commons rooms, dining facilities; sophisticated programming techniques for deciding the number of students to be accommodated on each floor, in each unit, and in each housing group. Greater attention is also being paid to the location of housing in relationship to playfield and recreation areas, the campus libraries and other common facilities. On the larger campuses, housing units are now being scattered, rather than concentrated in one area as they were in the past.
3. The operation of student housing as an income producing venture.
4. Participation by the institution in the quality of off-campus housing through direct participation in urban renewal, the policing and inspection of such units not owned by the university, the provision of low interest loans for off-campus construction, and occasionally the construction of off-campus housing itself.

While housing goals expand to include married students, faculty, and staff, the total percentage of students living on campus may drop in the next decade, barring a reversal of the present trends. The paradox is due in part to the scheduled construction and expansion of public institutions of higher education without housing accommodations. The location of new public institutions in California, Illinois, Florida, Massachusetts and other states is predicated on a site selection policy that places campuses within reasonable commuting distance of the greatest number of students. Two reasons are given for this policy. The cost of education to the individual or family is reduced if students can live at home. There is a trend towards larger families and a social acceptance of some form of higher education for all. With increased tuition costs and more children per family to educate, the establishment of the commuter campus thus seems reasonable as an economic arrangement. Commuting may reduce the cost of public education to the tax payer, as it is widely held, though not proven, that housing operations are not profitable.

1A
San Francisco Theological Seminary, Residence Halls
Architect: John Carl Warnecke (1959)
PHOTO BY DANDELET
1B
Sweet Briar College
William B. Dew Hall (1956)
PHOTO BY BOB FLOURNOY
2
Coeducational Housing (1959)
University of California, Los Angeles
Architects: Welton Becket & Associates
Landscape Architect: Ralph Cornell

Right wing is for male students, left for female. Ground floor shelters commons, playrooms, and administrative offices. Affectionately called the "Westwood-Hilton" by the student body.
3
Birch Hall, Antioch College (1949)
Saarinen and Swanson & Associates
Max G. Mercer, Associated Architect

4
West College, Princeton University 1836.
COURTESY: DEPARTMENT OF PUBLIC INFORMATION
5
Yale College at New Haven, Circa 1807
Influenced by Trumbull's plans.
REPRODUCTION COURTESY OF THE LIBRARY OF CONGRESS



4

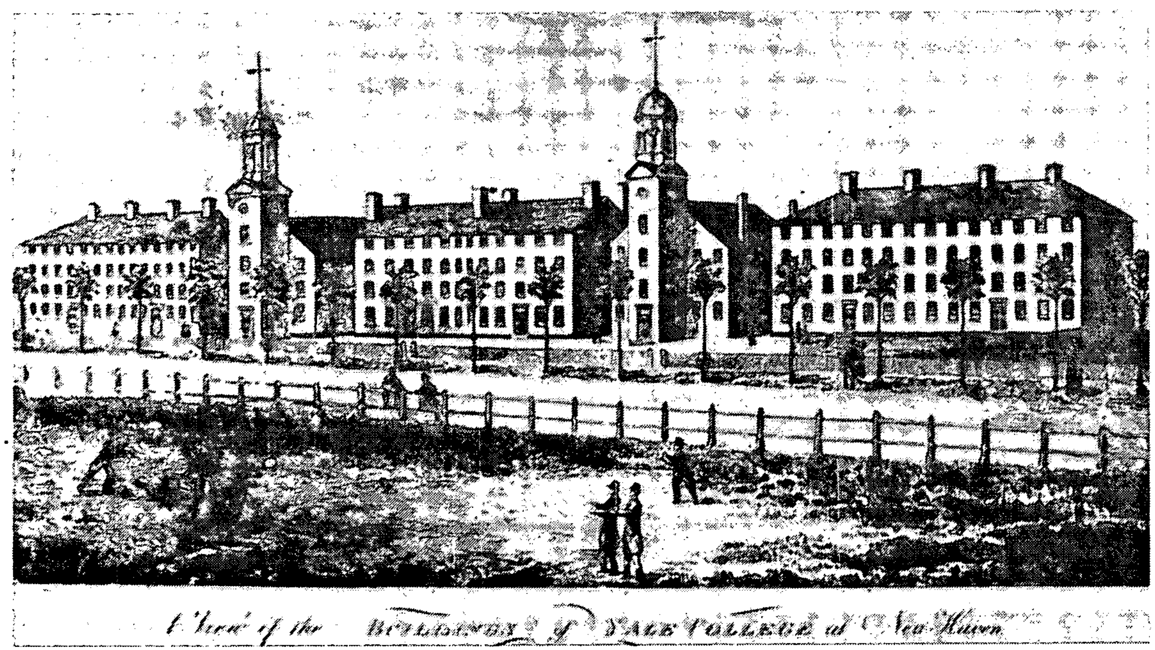
BACKGROUND

Many educators believe that proximity of living and learning accommodations is a prime requisite for higher education. This theme emerges time and again in the discussions about campus housing. Historically, institutional attitudes are marked with great ambivalence. The early colonial colleges rejected the continental university system, which had little interest in the student outside the lecture room. The heart of the English educational system was the Oxbridge (Oxford-Cambridge) residential college, in which students and faculty shared a common life. In adopting the Oxbridge philosophy, the American schools were too poor to provide the kind of architecture which was central to the English system. Cost was one factor, and lack of a building tradition was another. Unlike his English counterpart who was pledged to celibacy and residence in the college, the American professor was usually a married man; and, when he could choose, he preferred to live at some distance from the campus.

As a result, the early dormitories were no more than places to sleep and eat: "the secret nurseries of every vice, and the cages of unclean birds."[1] The lack of an ideal collegiate atmosphere was further attenuated by the problem of student discipline. Teacher and pupil would seldom meet except under the conflict and tension of compulsory chapel, class attendance, and recitation. Occasionally, the antagonism would develop into open warfare between the student and his part-time keeper.

The mantle of time shrouds the terrors that occurred in historic buildings upon which so many fondly gaze today. The diary of an early Princeton president recalls these incidents. "The faculty met in the evening, and a pistol was fired at the door of one of the tutors. I ought to be very thankful to God for his support this day." And two years later, ". . . a very serious riot . . . A great deal of glass was broken . . . an attempt was made to burn the out buildings."[2] In one violent scene at the University of Virginia, a professor was killed and armed constables had to be brought in to put down the disorder.[3]

College presidents held contradictory opinions on housing, though no one denied that poor housing made living dangerous and learning difficult. Stories of fire, disease, rowdy behavior fill the journals and memoirs of the early 19th century observers just as they had the decades before. Manasseh Cutler believed that any new college should force its students to live in town, not on campus. President Wayland at Brown called residential colleges "financial extravagance," and the money expended for dormitories far better used to build new schools for mass education. Despite ideological arguments in favor of greater self-reliance among students in choosing their living accommodations, and the cost of building, the voices of the earnest advocates of campus housing prevailed, particularly that of Noah Porter of Yale. And since Yale was the godfather of colleges and college presidents, the dormitory system continued in the East and Middle West through the 1860's.



5

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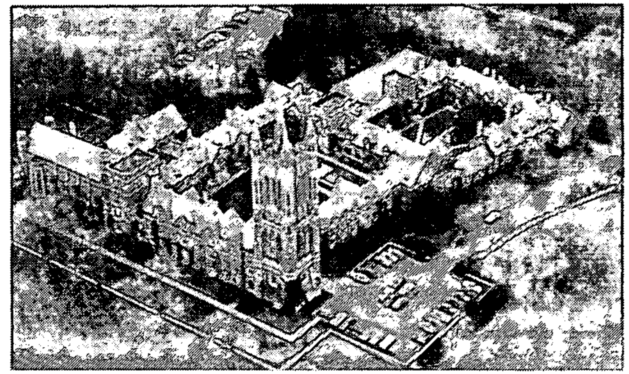
Many dormitories constructed before the Civil War had classrooms, administrative offices, cooking and dining facilities on one floor and bedrooms above. Elaborate dormitory architecture was still years away. In frontier areas staff and students would live in one building, as few colleges had more than a few hundred students, many less than a hundred. Urban colleges would be contained in a single structure too, which left little room for student housing. Columbia College, for example, was succinctly described in Miller's "Strangers Guide to New York City," 1866, as ". . . an edifice on 49th Street near Fifth Avenue . . . with a President, 12 professors, a choice library of classical works of about 18,000 volumes and a museum." The college didn't build its first residential hall until 1896, when it moved uptown. Fortunately, Columbia kept its property at 49th Street, which is now occupied by Rockefeller Center through a long-term land lease.

After the Civil War, the rapid growth of public institutions presented the problem of housing more students at a time when there was little money to construct academic buildings, let alone dormitory facilities. Housing lagged behind other construction. At such Western state universities as Minnesota, Michigan, and Illinois, there are no dormitories more than fifty years old, though some of these universities have celebrated their centennials.

Two changes helped solve the housing shortage: private boarding houses grew in size and number in the neighborhoods around the campus; fraternities and sororities shifted from social and intellectual organizations to purveyors of meals and beds on a grand scale.

The gulf between curricular and extracurricular life, however, widened. As a counterbalance, administrators encouraged the construction of student unions. These were usually paid for by public subscription or bonds liquidated from the profits of operation, and hence, not carrying the onus of a tax burden. The first student union was opened at Ann Arbor, bringing all persons at the University of Michigan together "in a wholesome, democratic way . . . by providing common means of recreation."[4]



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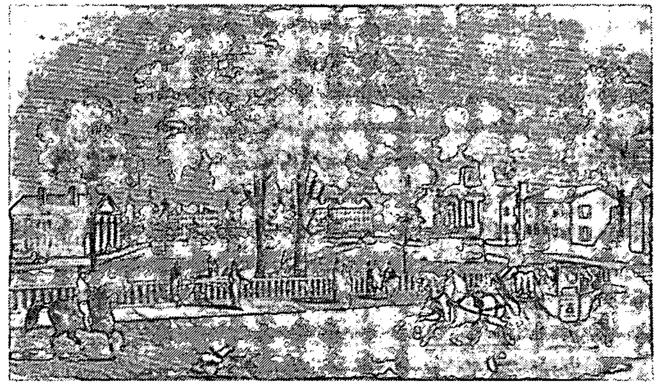

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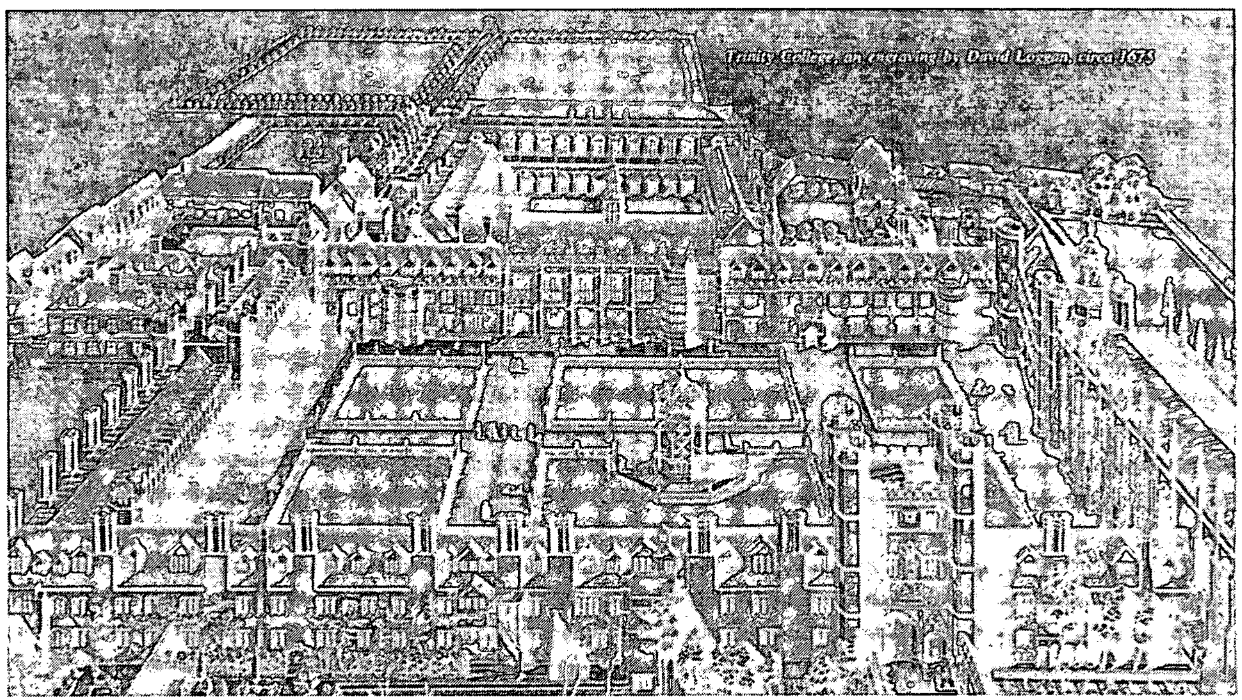


8

6

Graduate College, Princeton University (1913)
Cram and Ferguson

The smaller quadrangle in the upper right corner of the photo was constructed in 1927. Of this group, Henry-Russell Hitchcock writes (*Architecture, 19th and 20th Centuries*): "The technical competence of American architects in this period was very great, the sums of money available almost unlimited, and the avowed standards of design only the vague one of 'taste' and 'correctness,' by this time little more than a schoolmasterish respect for precedent in detail, though rarely in overall composition."
COURTESY OF DEPARTMENT OF PUBLIC INFORMATION

7

Franklin College, Athens, Georgia, circa 1850.
REPRODUCTIONS COURTESY OF THE LIBRARY OF CONGRESS

8

Trinity College, circa 1675
Cambridge, England
Poverty, a lack of an architectural tradition, an uncertainty as to educational purposes left their mark on the American campus. The emulation of the English models was at best a token obeisance to an educational symbol.

REAPPRAISAL AND RESOLUTION

Though immersed in the most significant change ever to occur in American higher education—the development of the university—leading educators in the last half of the 19th century still clung to the Oxbridge ideals, though at the time, in England itself, this way of life had become more nostalgic than real. In inaugural addresses and farewell speeches, the American leaders supported the theory that a closer integration of residential accommodations and educational facilities would produce a higher standard of learning, a cultured person, a knowledgeable citizen. The integration was already happening to a degree at women's colleges. But elsewhere, time and again, proposals towards this end were rebuffed, even when the funds were available.

Woodrow Wilson failed at Princeton as did Alexander Meiklejohn at Wisconsin. Both men were unable to overcome the resistance to fraternal organizations on campus, which by then had invested considerable money and social prestige in buildings and eating clubs. Wilson was further piqued by Dean Andrew F. West's plans for separating the graduate education program from the rest of the University by building separate housing areas. Losing support of the trustees, Wilson resigned. West proceeded with his plans, and Ralph Cram clothed the first plant devoted solely to graduate students in a "picturesque Gothic mass . . . looking out over a lush golf course and a tree-lined stream, beloved by ducks and geese."[5] Despite opposition to his "medieval" concepts, William Rainey Harper did succeed in having one half the total cubage at the University of Chicago set aside for housing, which was "a radical departure for the Middle West of that day."[6] Death, however, cut short his ambitious plans for realizing a residential college on the Cambridge model.

The social stratification that accompanied the industrial boom and immigration after the Civil War led to an important shift in housing policy along the Eastern seaboard. The privately endowed schools attracted large numbers of wealthy students from all over the country. For this group, private entrepreneurs raised palatial suites in which the students could live in ease and luxury.

Harvard's *Gold Coast* was the most famous, a series of buildings convenient to the social clubs along Mt. Auburn Street and the Yard. The enthusiasm with which this housing was accepted inspired the administrations at Yale and Princeton, among other institutions, to emulate these facilities. The motivation was not so much educational goals as conspicuous consumption. Though the buildings eventually failed as architecture once the fashion in styles had passed, they held several promising seeds for the future. From these beginnings which were becoming to history and flattering to the universities themselves, came the firm conviction among a large group of the private schools that housing the undergraduate body and graduate body was a binding duty which the institutions could not neglect. As a result, one of the sharpest distinctions between public and private facilities for higher education today are the difference between the quality and quantity of campus housing.

Because they transmitted the English concepts into a viable housing pattern uniquely its own, and because they represent a standard, the Harvard experiences in undergraduate housing are worth summarizing.

While President Charles W. Eliot of Harvard decried the excesses of the Gold Coast system, he did little to interfere with faculty or undergraduate extracurricular life. Eliot's laissez-faire attitude about the university's concern in these matters was dramatically reversed by his successor, Abbott Lawrence Lowell. "Man is by nature a social animal," he said in one of his first speeches as President of Harvard, "it is in order to develop his powers as a social being that American colleges exist. The object (of the institution) is not to produce hermits . . . but men fitted to take their places in the community and live in contact with their fellow men."[7] This was the social function of college sponsored housing.

As to educational purpose, Lowell summarized his views before the Association of American Colleges (1931). "All education beyond the grade of drill is self-education." And as for the campus and the students, nothing is more important than "an environment conducive to their educating themselves."[8]

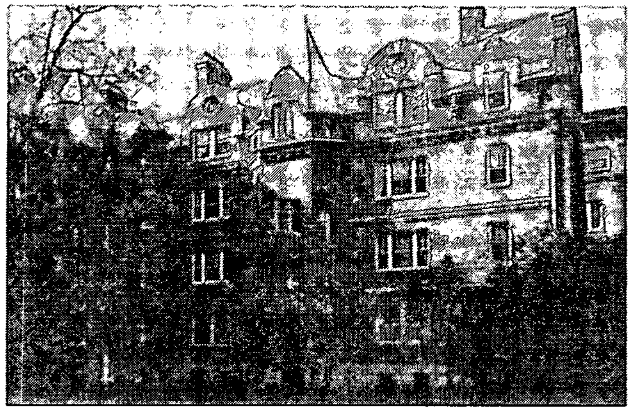
With great diligence Lowell chased his dream of a residential college. Though continually short of funds, he built all his dormitories with this goal in mind. Lowell's plans were finally realized in the late 1920's with a large gift from Edward Harkness. Harkness was impressed with the English colleges which he saw several times. Arguments mustered in favor of a residential system in America, as outlined in a 1926 Harvard Student Council report, led him to offer Yale the money to build a residential quadrangle. When the New Haven administration faltered, he turned to Harvard and President Lowell quickly accepted the gift. Later, Yale followed suit when Harkness again made his offer.

The house-plan system parallels the Oxbridge integration of living accommodations and special educational facilities. It encourages a campus life that is more democratic, intellectual and venturesome. It raises housing goals from the function of mere shelter to the creation of a total environment for learning. Housing of this type cuts across the lines of status, creed, race and academic specialization. Under the Harvard system, the undergraduate receives his scheduled instruction in college-wide facilities. All freshmen are required to live in the Yard or buildings adjacent to the Yard, now that the entering classes have swamped the older facilities. A sorting out process takes place in the Spring of the Freshman year, during which the students are assigned or select their house for the sophomore, junior and senior years. During the next three years, the student's leisure, study, residence and learning hours are centered around his house. It is a dormitory building with its own eating facilities, common rooms, library and resident dean. Coaching in academic subjects is carried on

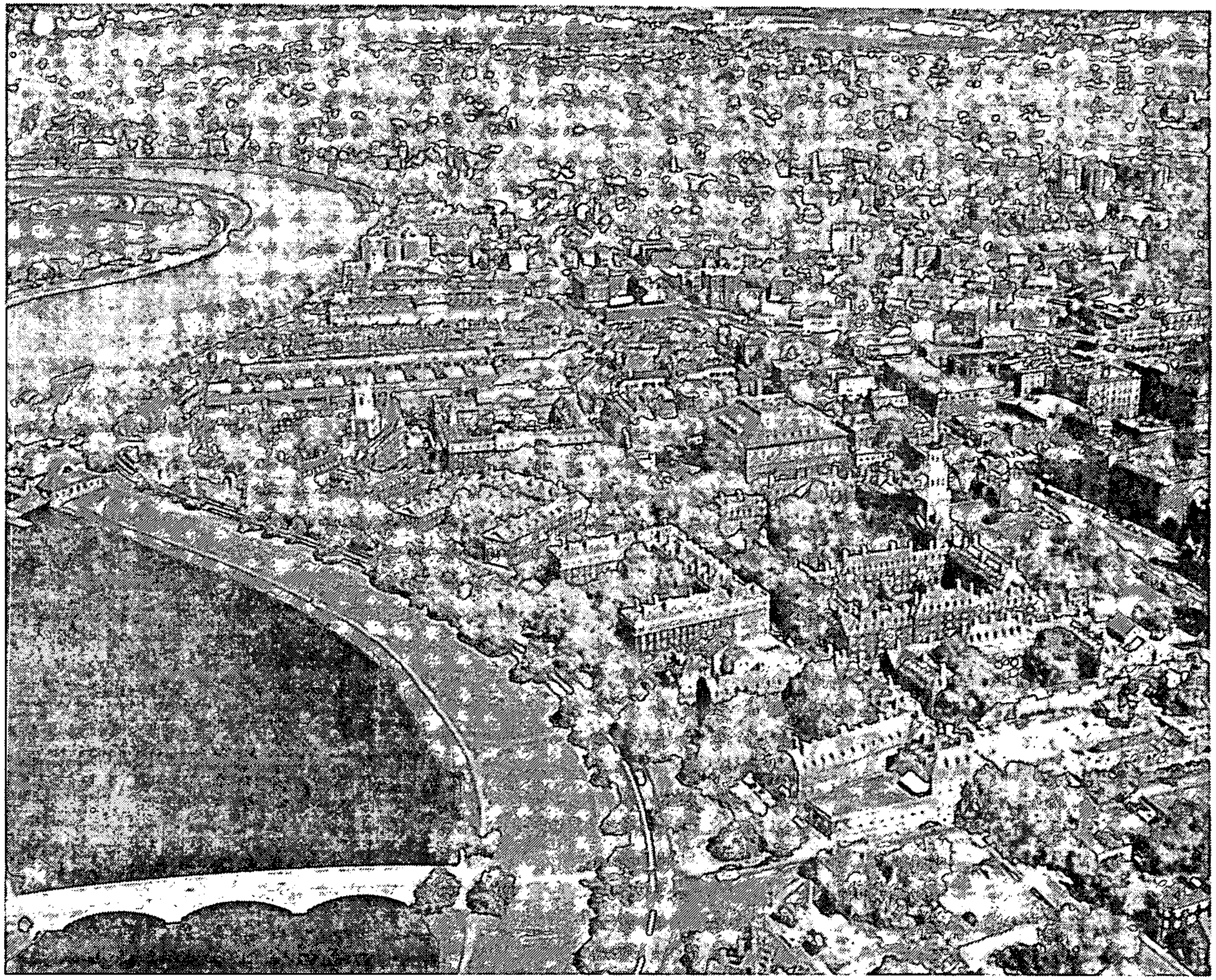
House tutors, or by other university teachers assigned to, but not necessarily in actual residence there. Houses offer a wide variety of intellectual and social milieus; each house has a distinctive personality of its own.

In their perceptive study of the Harvard Houses, Christopher Jencks and David Riesman recently pointed out that as a building type they are not a practical model for emulation by less affluent institutions; but as intellectual communities, they could become such a model.[9]

In addition to providing an enriched environment for learning, the importance of the house plan concept, as far as physical planning is concerned, lies in its potential for reducing a large physical plant requirement into smaller physical units. Each unit can have a distinctive site, setting and architecture. Enlargement of total housing facilities by constructing a new group, and the siting of the groups on a scattered pattern throughout the campus, give maximum opportunity and flexibility for accommodating growth in the total physical plant or reorganization of the campus plan, should new academic alignments be called for. A college which has a house plan arrangement now, may be able to convert that grouping into a graduate center later; and subsequently, the graduate center into a housing complex for a professional school.



9A



9B

9A

Randolph Hall (1897)

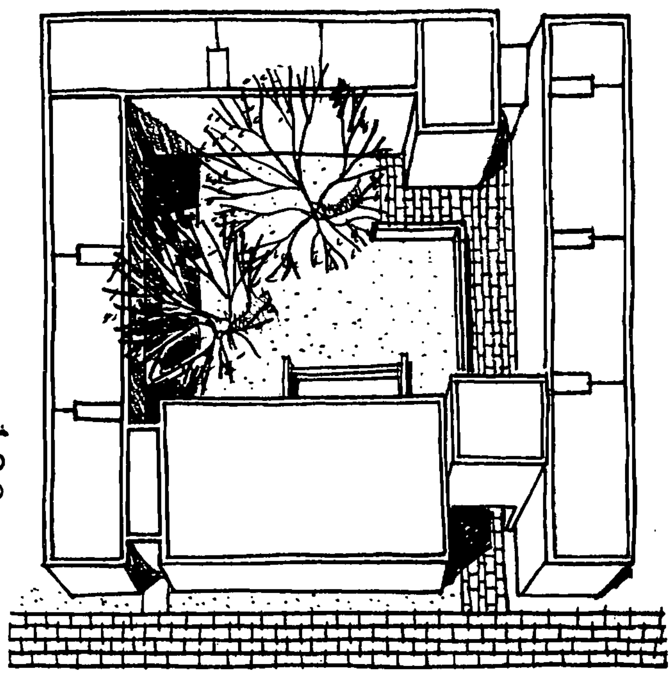
A "Gold Coast" apartment acquired by Harvard in 1920 and now part of Adams House.

9B

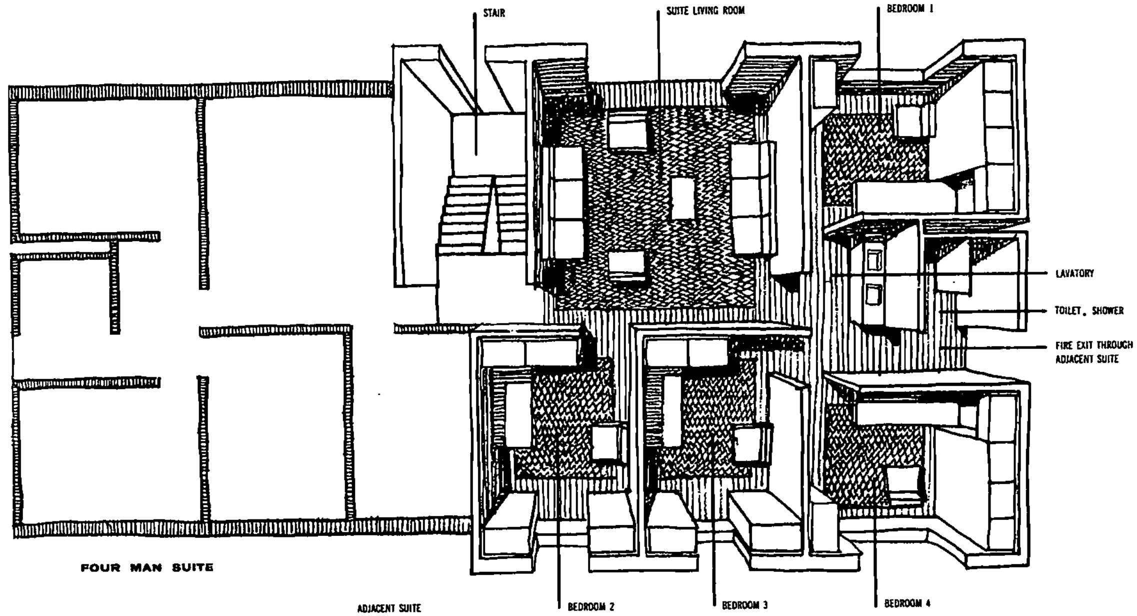
The Harvard Houses and the Charles River

What has become one of the important urban design scenes in the United States is less than a half century old. The middle houses along the river date back to 1914, the remainder shown in this photo, 1930-31.

PHOTOGRAPH BY: BRADFORD WASHBURN



10A



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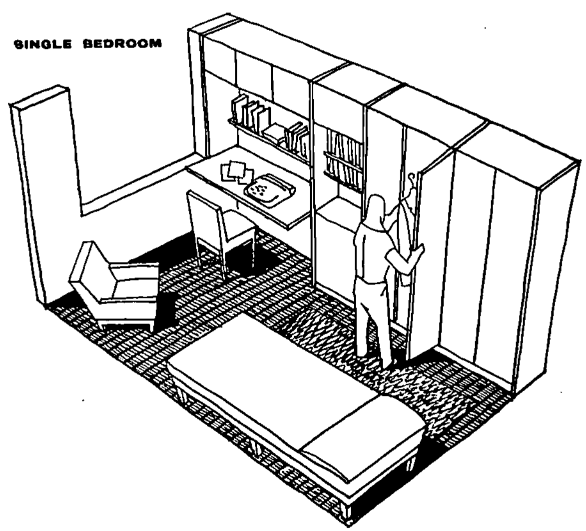
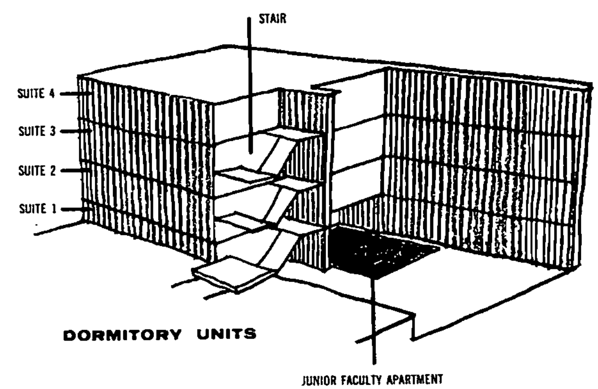


10B



10D

10A-J

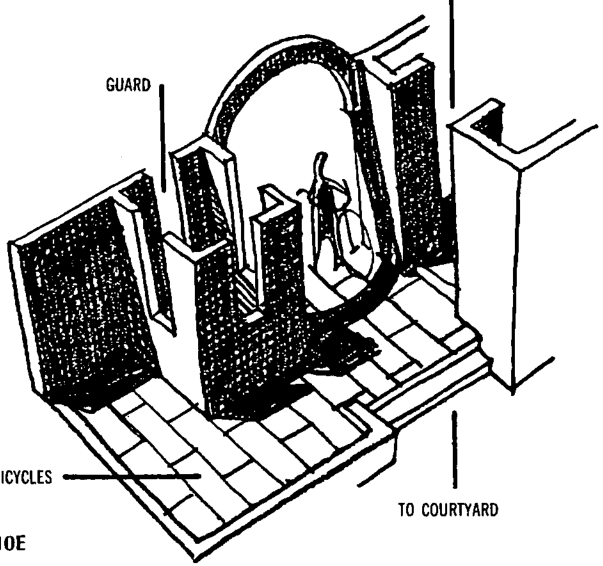
The Anatomy of the House Plan

The house plan breaks down large enrollments into group sizes that allow voluntary, personal, face to face friendships to occur, as well as groups to form and identify themselves with a common environment, which is the House. In this example the House begins with a single bedroom, which is organized into a four-man suite, and the four-man suite into eight units organized around an entry. Library, dining hall, common rooms, and apartments for the Head of House and sometimes tutors, are included under one roof.

Drawings from: Development Program for Undergraduate Men's Housing, University of Pennsylvania

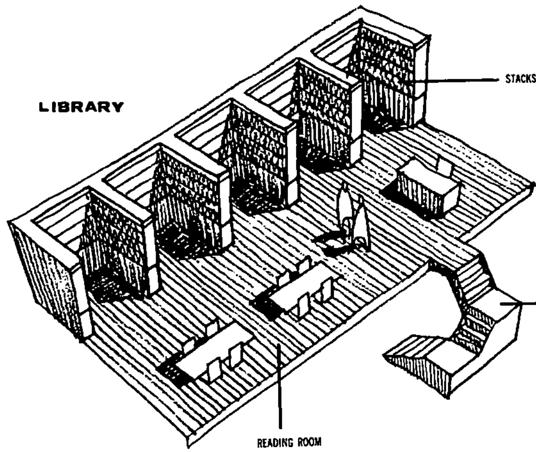
Courtesy: Geddes, Brecher, Qualls & Cunningham—Architects

ENTRY AND GUARD



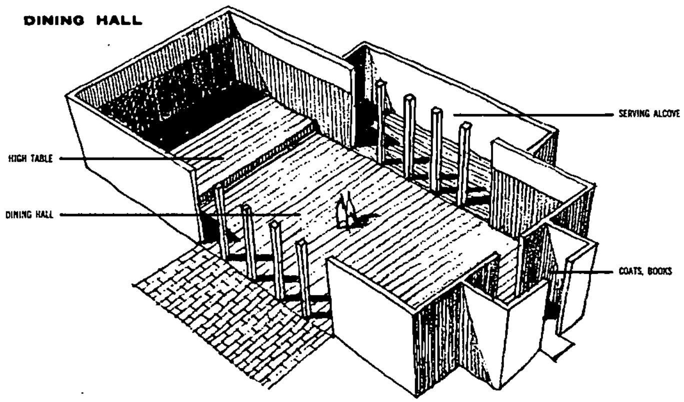
10E

LIBRARY



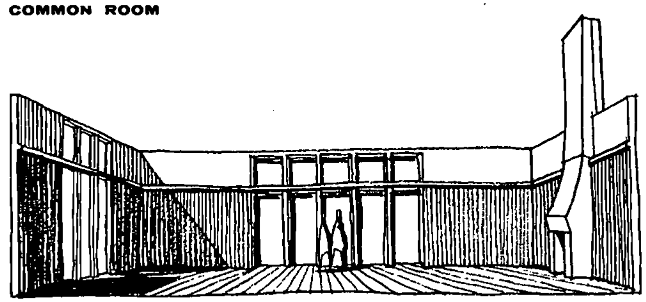
10F

DINING HALL



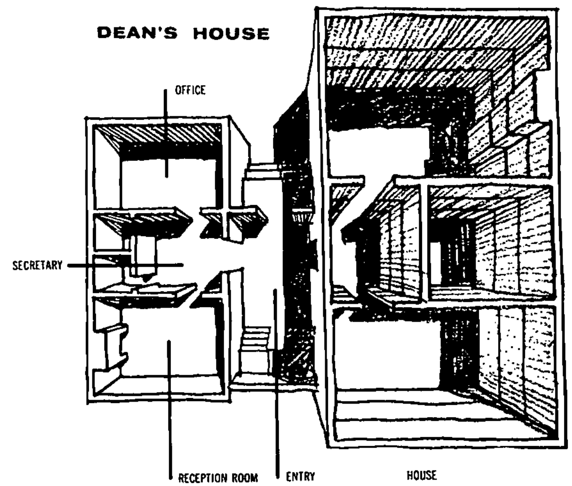
10G

COMMON ROOM

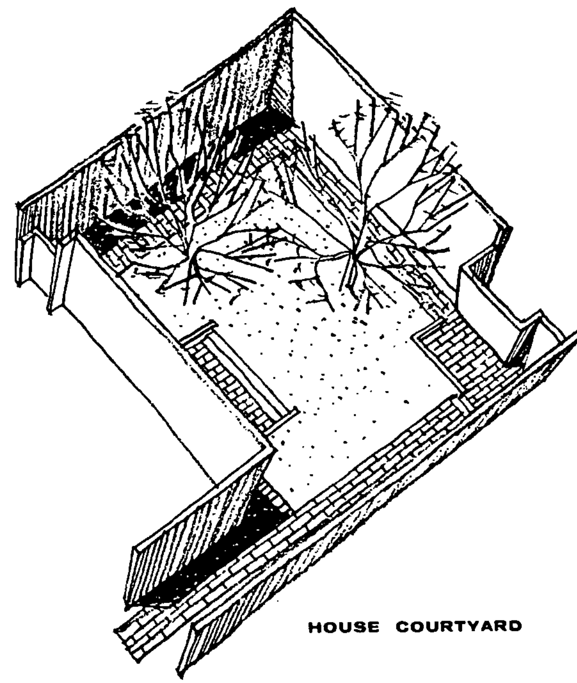


10H

DEAN'S HOUSE

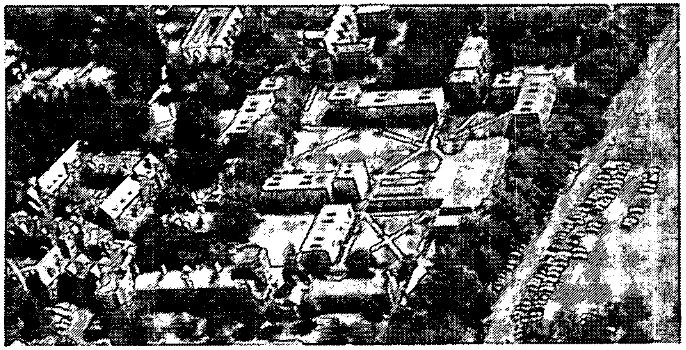


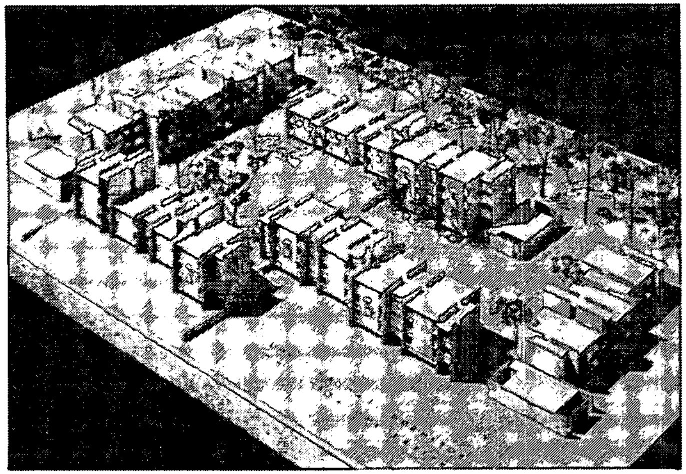
10I

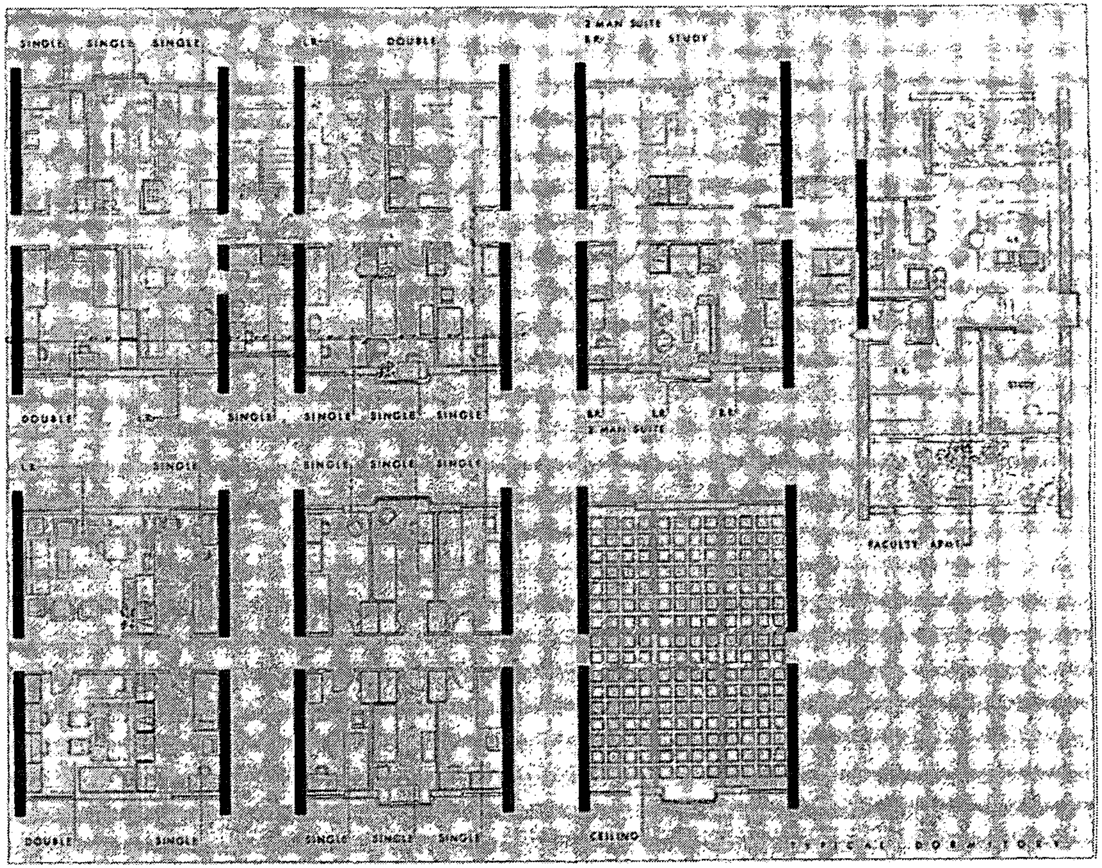


HOUSE COURTYARD

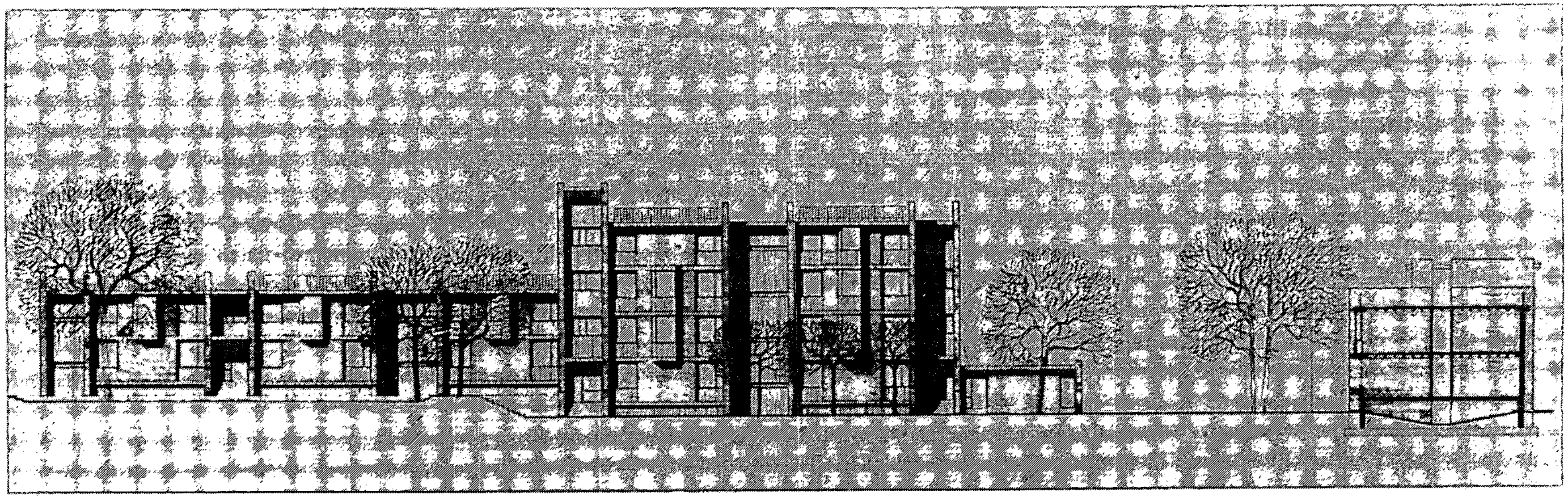
10J


11A


11B



11D


11C

A, B, C, D
idergraduate Dormitories (1962)
rrinceton University, Princeton, New Jersey
Male
Privately supported
Enrollment Spring 1962: 3,904
Total Units: 277
Single rooms: 167
Double rooms: 55
Living rooms: 53
Faculty suites: 3
Total Cost: $2,563,000 (estimated)
Architects: Hugh Stubbins and Associates

Reflecting in vernacular terms Princeton's vernacular, this men's undergraduate dormitory is notable for its siting, flexibility and sensitive regard to the interior requirements of housing–characteristics which this particular architect has long supported in his work.

11A

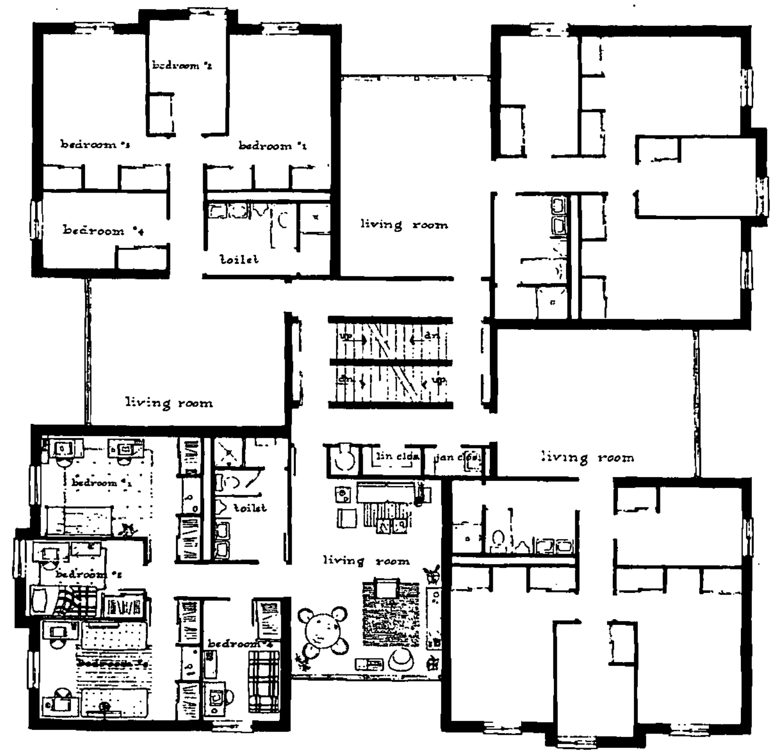
Pictured left to right, Cuyler Hall quadrangle (1912), The Class of 1915 quadrangle (1950), and the contemporary quadrangle by Sherwood, Mills and Smith (1961). The new group will be located on the flat plain, to the right of the trees, where the automobiles are parked.

11B

Exciting but not flamboyant design effects have been achieved, (with three deceptively simple modules of one, two, and three stories each) by mixing the units in elevation and arranging the five groups on two levels around an interior courtyard.

11C, D

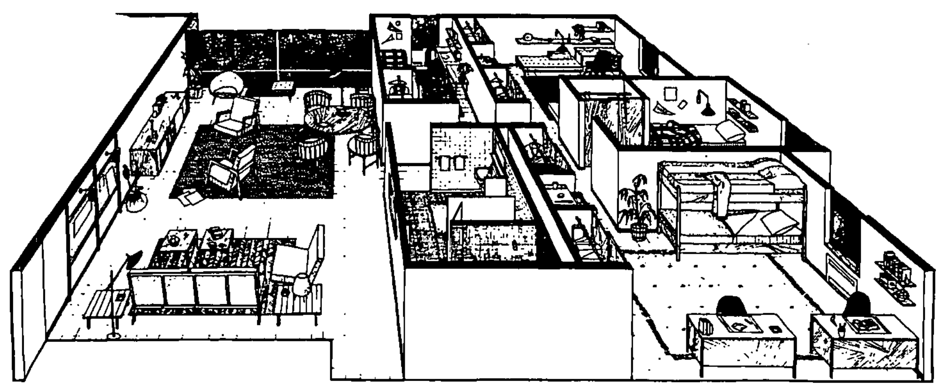
As shown in elevation and floor plans (lower left) the units are arranged around an entry hall, with toilets set between the modules. For monitoring purposes a bachelor apartment (27 feet by 36 feet) is located at the end of each group. Massive bearing walls between each module enable the double rooms and two man suites to be converted into three single rooms, if need be in the future.



12B

12A, B
Another variation on the house plan
Residence Halls
Washington University
St. Louis, Missouri

Drawings courtesy the architects:
Hellmuth, Obata and Kassabaum



12A

13A

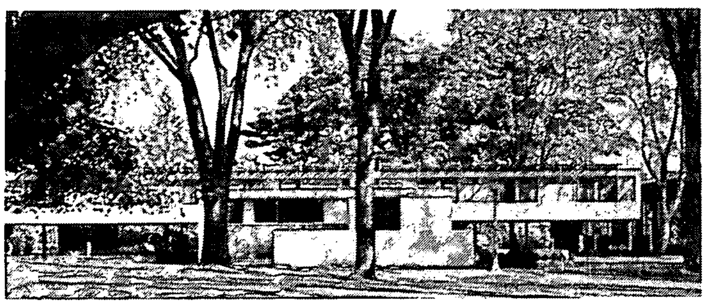
Co-operative House, Vassar College (1950)
Poughkeepsie, New York
Women
Private support
Spring 1962 enrollment: 1,470
Architect: Marcel Breuer

Housing 27 students on a co-operative plan, this residential unit was designed to reduce the cost of housing by having the resident share expenses for cooking and daily maintenance.

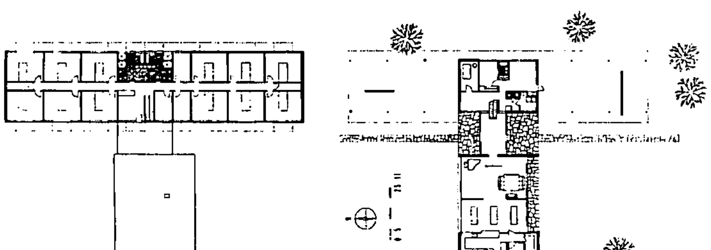
13B

The second story dormitory, shown on the floor plan contains 24 double rooms and 3 single rooms. Communal rooms are located on the west side of the first floor of the structure and housemother's quarters on the east.

PHOTOGRAPH BY: MOLITOR



13A



13B

THE DESIGN OF HOUSING IN THE SECOND HALF OF THE 20TH CENTURY

To what extent did the theory of college housing affect the design? The half-century review of current American architecture in the 50th anniversary issues of the "Architectural Record" (January and February, 1941) is illuminating. There was no college or university housing as distinguished as the private residential work by Gardner A. Dailey, William W. Wurster, Richard Neutra and Aldon Dow. The single example cited was Silliman College by Eggers and Higgins at Yale University. "In the Colonial idiom," carrying on "a still rigorous tradition," wrote the editors.[10] "*Rigor* something," thought one reader.

Enigmatically, among college and university buildings constructed in the immediate post-war period, housing alone found a place as architecture of "quality and significance" in the Museum of Modern Art's 1953 exhibit, "Built in the U.S.A." The choices of Henry Russell-Hitchcock, who selected the buildings, stand now more as symbols of enlightened institutional attitudes than accomplished works: Alvar Aalto's dormitory at M.I.T. (1948), compromised by the site; Walter Gropius's and TAC's Harvard University Graduate Center (1950), marred by poor interior detailing through generously continuing Harvard's tradition of excellent urban spaces and sensitive siting of buildings; and Marcel Breuer's cooperative dormitory at Vassar (1951), one of a series of distinguished college buildings by the quiet master, but certainly not his masterpiece. Somehow the critics missed Saarinen's and Swanson's Birch Hall (1946) at Antioch College—beautifully sited, comfortable to live in, years ahead of the many imitations that followed.

Post-war construction of college and university housing was considerably spurred by Title IV of the Housing Act of 1950, administered by the Housing and Home Finance Agency. Title IV provided low interest long term mortgages for campus housing and related facilities. At the 1955 mark, the results were inclusive, both in design and in the promise which the program originally held for providing more than just a clean bed in a clean room. Overtones of the public housing debate could be seen in the criticisms of the required high-maximum occupancy levels. Loan regulations reduced the chances for many single student suites and small social groupings on each floor, which, in turn meant more students housed in a unit than some colleges felt could be properly supervised.

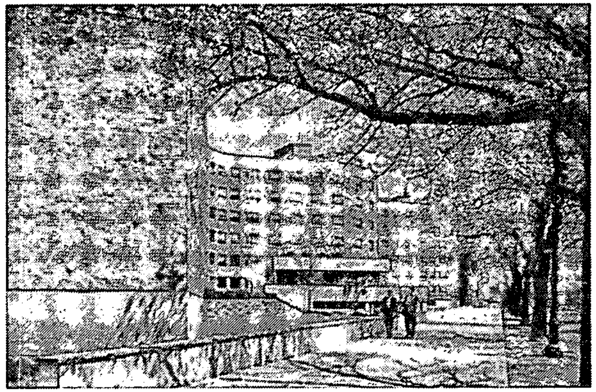
However, this was a matter of degree. An examination of the 967 units built by 570 institutions in 1958 showed over 80 per cent of the buildings were occupied by less than 250 students, while 25 per cent of the units had between 51 and 100 students.[11] By the end of 1961, seventy per cent of all eligible colleges and universities in the United States had applied for loans. Under 1582 loan contracts at 1486 institutions, over $1.6 billion dollars had been approved for 365,000 accommodations and a number of dining facilities, college unions and infirmaries.[12] The design record ranged from heavy-handed period architecture at Tufts University and the University of Maryland, to the straightforward functional solutions of Belluschi and Skidmore, Owings, and Merrill at Reed College, and Saarinen at Drake University.

Several colleges were not content with accepting past standards. Case Institute of Technology had the productive experience of "live testing" its housing units in 1952. A mock-up of a proposed room was constructed and occupied for several weeks by students. Changes in the interior arrangements, based on the students' suggestions, resulted in a saving of ten per cent in the final cost of the entire building. Case believes now that the mock-up approach to design is an exceptionally fine method of developing housing or other facilities in which several repetitive units compose the whole. The mock-ups have been invaluable in studying room-size, functional arrangement, ceiling height, lighting, furniture design, closet size and the use of specific types of materials. In 1962, Case again laboratory tested plans for its latest dormitory. Teams of students lived in the mock-ups for three months and the

chitects themselves spent a few days in the rooms before the designs were completed.

At MIT (1956) a special student committee helped the administration frame a long-range plan for housing that would ultimately reduce overcrowding in some facilities and expand the Institute's housing goals.[13] By 1962, married student housing and women's housing were under construction, signifying the concept: housing for all. In the design of Quincy House, Harvard had great success in adding a contemporary building to a Georgian landscape—giving three dimensional evidence that neither the old nor the new had to be compromised to achieve a high level of sound design.

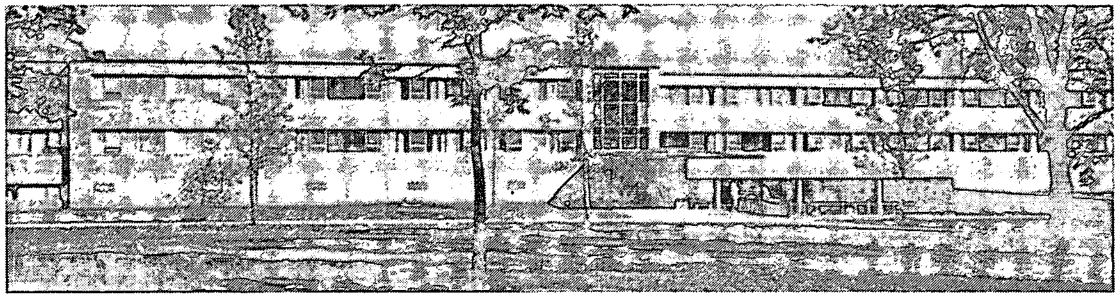
For their housing study, "College Students Live Here" (1961), Harold C. Riker and Frank G. Lopez were able to find one hundred good projects built since 1945. And if there were ten times as many bad buildings as good, there were at least some successful examples embodying long-sought-for advances in college housing: generous living spaces, adequate baths, noise control, good lighting, excellent site planning, reasonably sized social units, convenient dining facilities, dstinguished contemporary architecture; and on the cover of their report, a drawing of Eero Saarinen's new colleges for Yale University, showing sheer walls, textured materials, interesting ground spaces — the abstracted qualities of the best of the Oxbridge quadrangles.



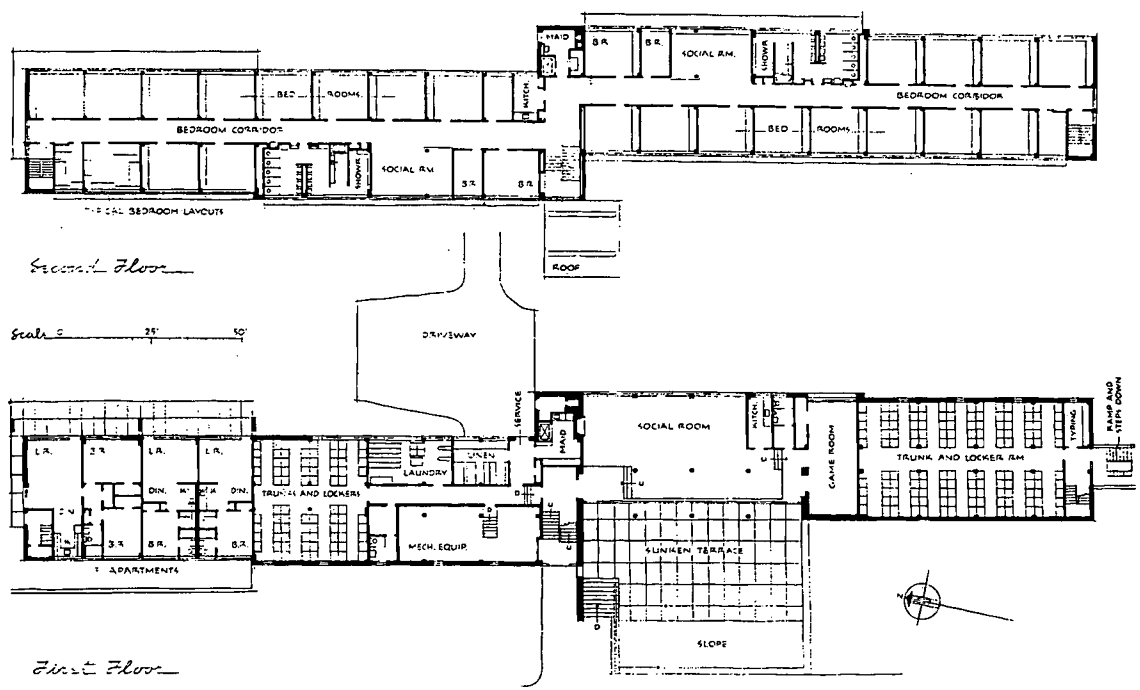
14

14
Baker House (1948)
Massachusetts Institute of Technology.
Architect: Alvar Aalto
PHOTO BY: MIT PHOTO SERVICE

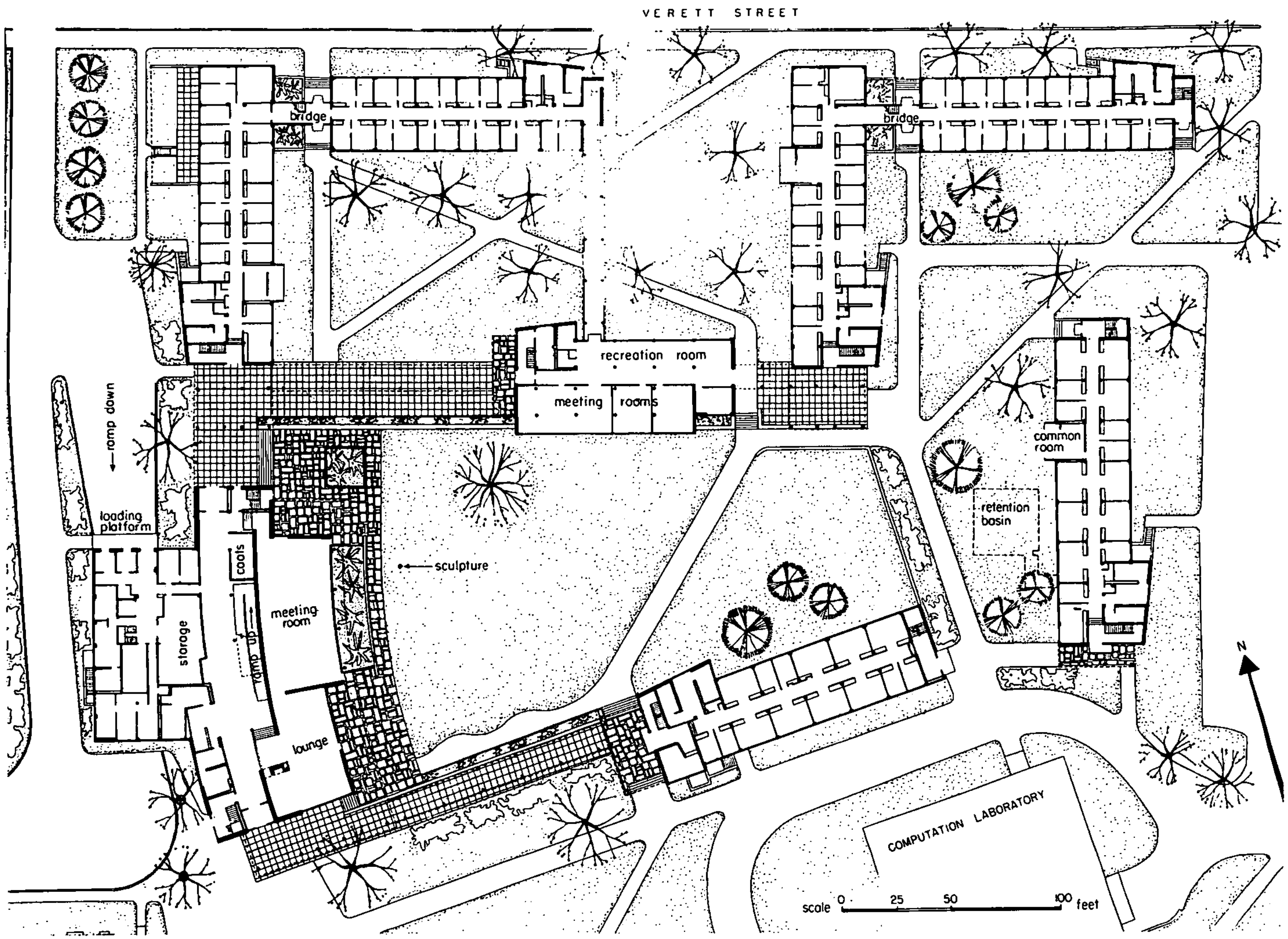
15A, B
Birch Hall, Antioch College (1949)
Saarinen and Swanson & Associates, Architects
Max G. Mercer, Associate Architect
Dan Kiley, Landscape Architect



15A



15B

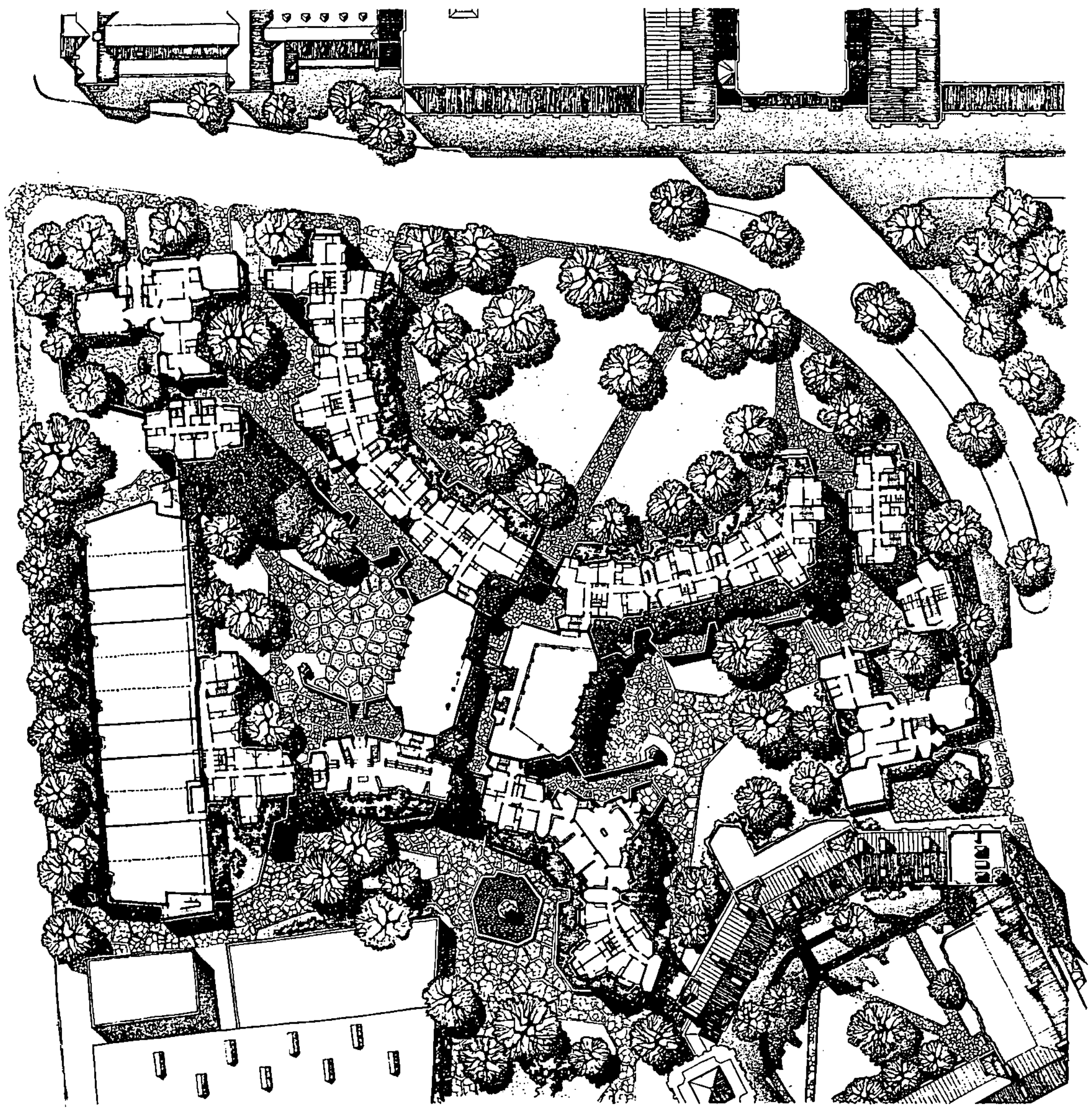


16A

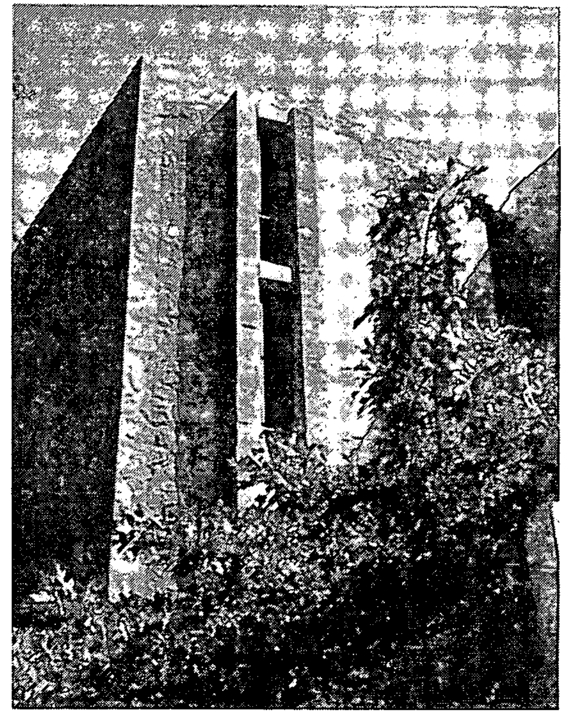
16A, B
Harvard Graduate Center (1950)
Walter Gropius
The Architects Collaborative
PHOTO: FRED STONE

16B

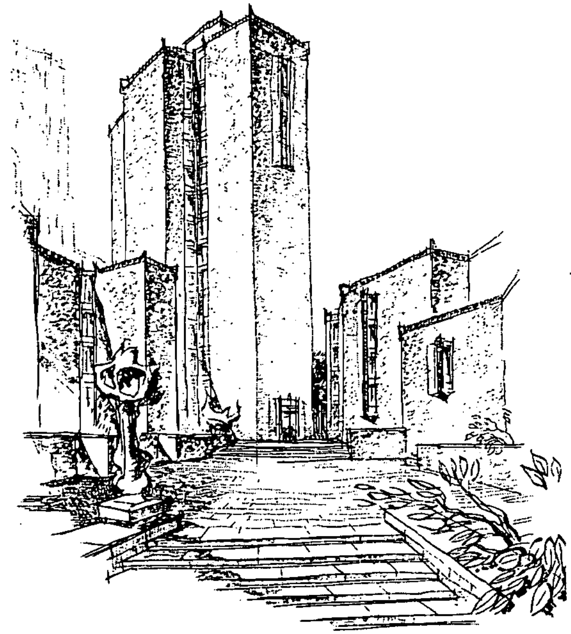
17A, B, C
Ezra Stiles and Samuel F. B. Morse Colleges (1961)
Yale University, New Haven, Connecticut
Architects: Eero Saarinen and Associates
Drawing by: Eero Saarinen
PHOTO BY: DAN PAGE



17A

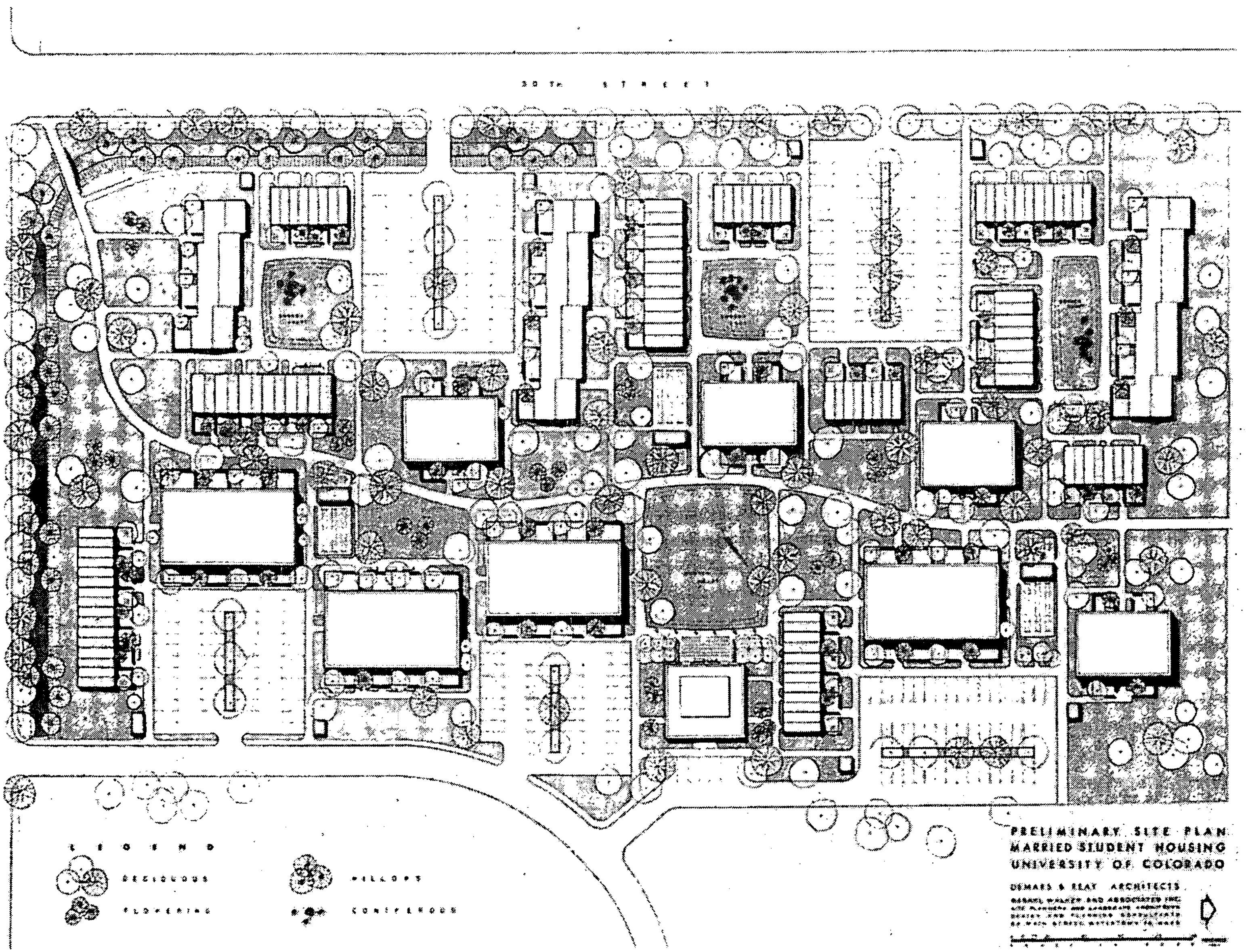


17B



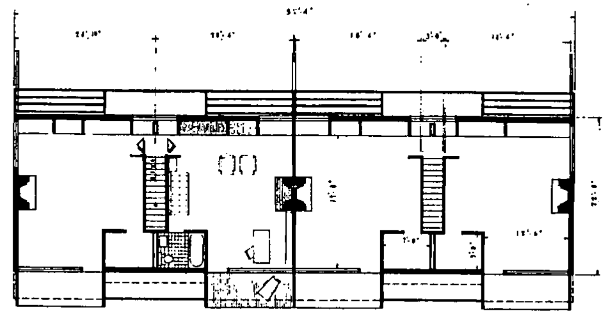
17C

18

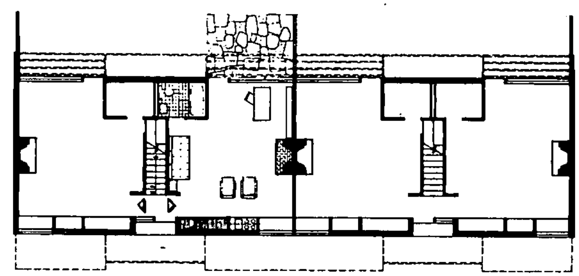


18

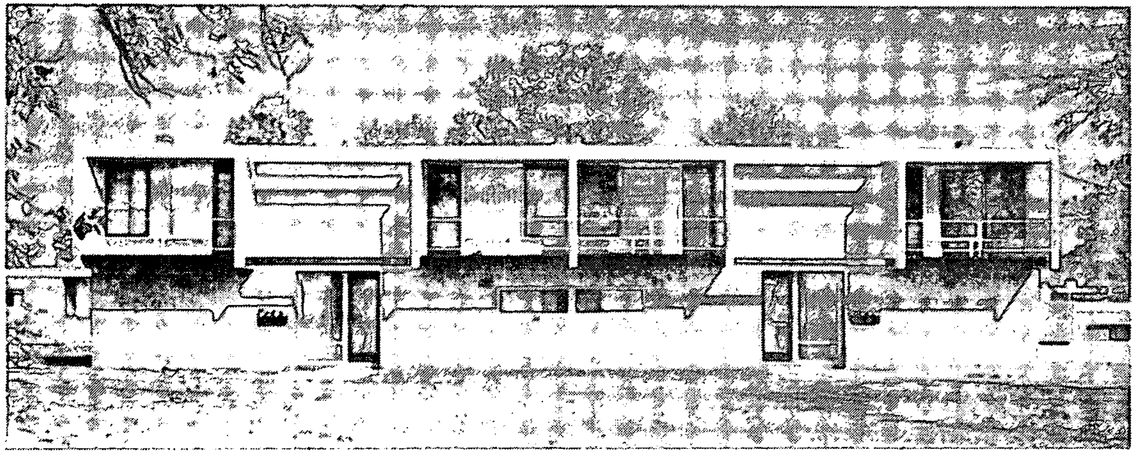
University of Colorado Housing (1962)
Architects: DeMars and Reay
Landscape Architects: Sasaki, Walker and Associates, Inc.



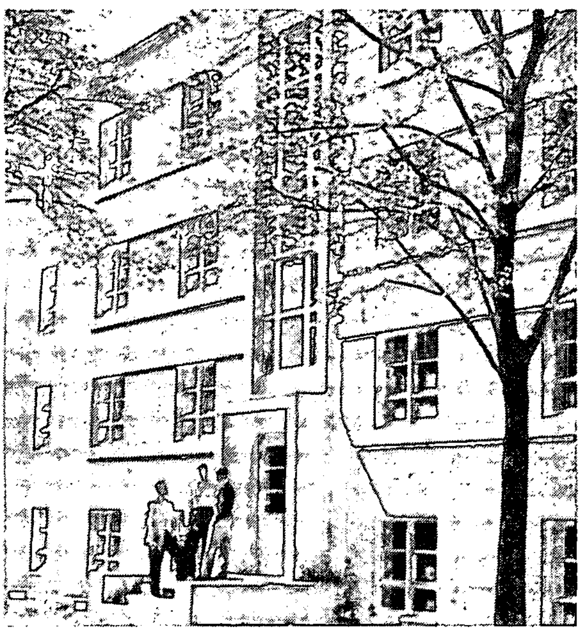
19B



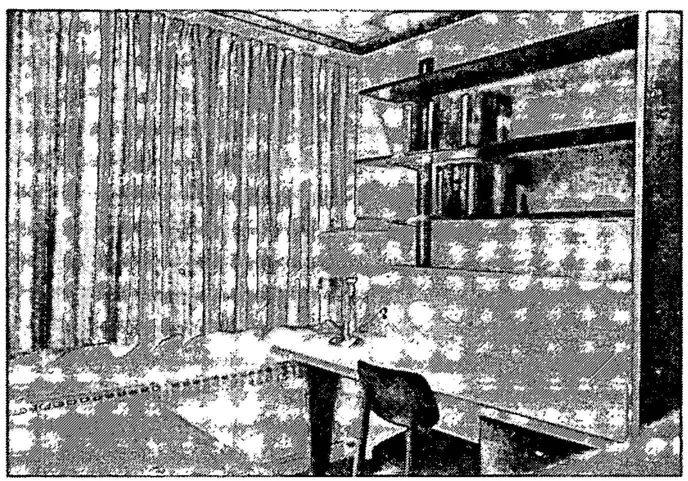
19C



19A



20A



20B

19A

Members Housing (1955)
Institute for Advanced Study, Princeton, New Jersey
Bachelor's apartment
Architect: Marcel Breuer
Robert F. Gatje, Associate

19B, C

Floor plans

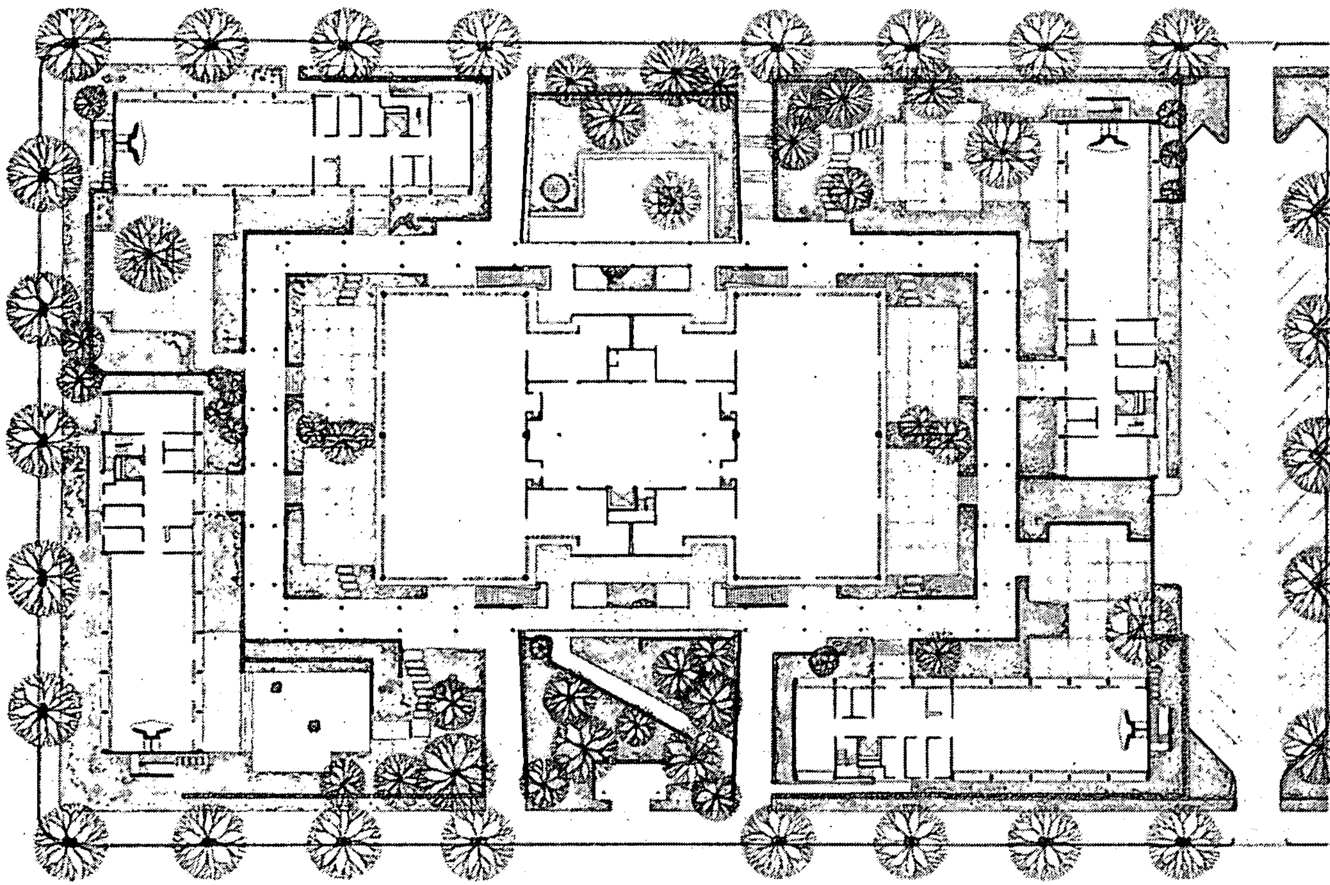
PHOTO LEFT: BEN SCHNALL

20A, B

Yost Hall (1951)
Case Institute of Technology
Cleveland, Ohio
Co-educational
Private
Spring 1962 enrollment: 2,340
Architects: Small, Smith and Reeb

The building's design was predicated on live-testing mock-ups of typical units. Mock-ups are shown below.

PHOTOGRAPHS COURTESY OF CASE INSTITUTE



21A

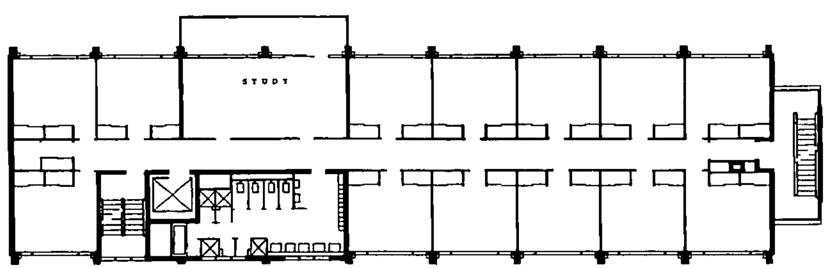
21A
Residence Halls (1959)
University of California
Berkeley, California
Co-educational
Public supported
Spring 1962 enrollment: 23,000
Architects: Warnecke & Warnecke
Landscape Architect: Lawrence Halprin

These first four units of a proposed 3200 student residential complex are built on the periphery of the Berkeley campus. High land costs in the environs, the limit of 255 gross square feet per student, and the desire to create as much outdoor living space as possible in a dense urban area were critical design factors.

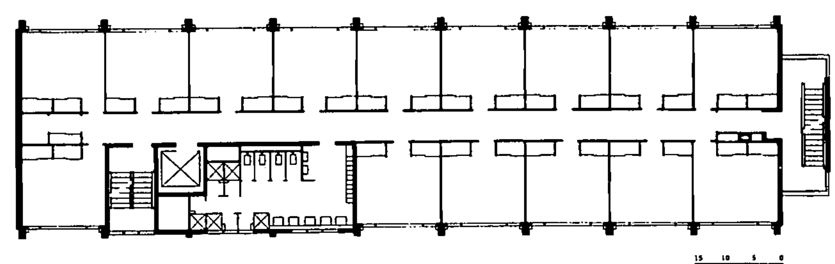
Each of the four nine-story units accommodates 210 students. There are from 15 to 17 double rooms on each floor. Social groups of fifty students each are formed by having a common study room every two floors. Living room floor contains a library and lounge. Central core contains dining halls and kitchen. Of special significance are the courts, which separate the living units and provide outdoor living space. All outdoor spaces and building units are joined by covered walk system, taking good advantage of the mild climate.

By placing the units along the perimeter of the site, the entire complex centers on the interior court, shutting out the none too pleasing environs. A richer design effect in the central court area was made possible because the area is used by all residents.

21B
Typical floor plans

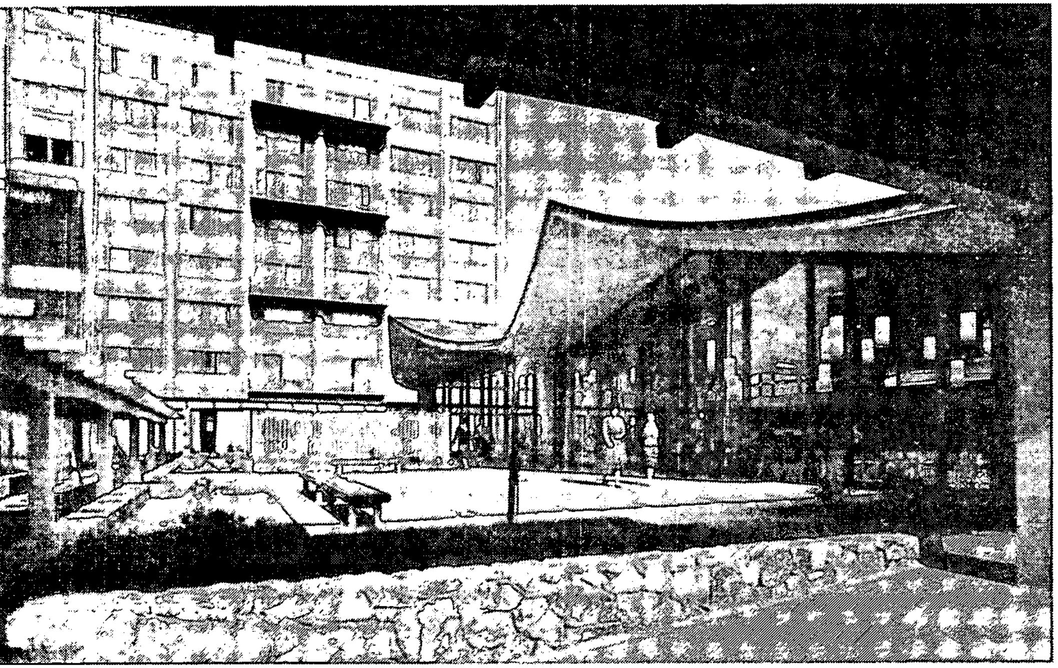


DORMITORY AND STUDY FLOOR
21B

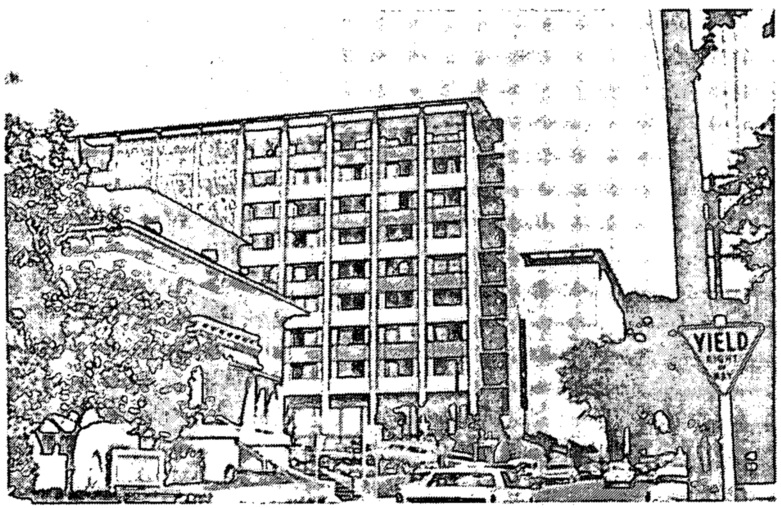


TYPICAL DORMITORY FLOOR
21B

142

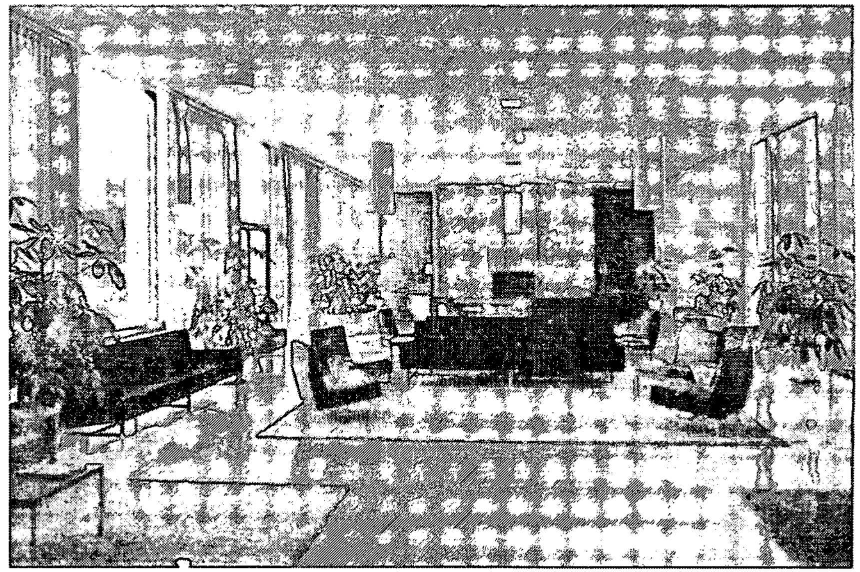


21C



21D

21C
Courtyard
21D
Streetscene
21E
Interior of first floor student lounge
PHOTOGRAPHS BY: ROGER STURTEVANT
COURTESY OF WARNECKE & WARNECKE, ARCHITECTS



21E

PROGRAMMING HOUSING

Programming housing to a large extent depends on how definite a commitment the institution is willing to make with reference to housing obligations and standards. Page 135 lists the kinds of on-campus residences that should be considered in any long range plan. Minimum planning standards are listed for preparing building modules, which in turn are a key to land use decisions. To ensure sufficient review of general policies, and to understand the consequent implications which housing decisions may have on the overall campus design, the following steps should be taken:

1. REVIEW EXISTING HOUSING AND HOUSING POLICIES

The preparation of a campus plan provides an opportunity to examine the institution's policies on housing. If time and resources permit, a thorough study is warranted. Begin with a review of existing campus housing including an analysis of operations and cost, and structural conditions of buildings, especially as to how well they conform to local fire and health regulations.

Scrutinize the supply of housing off campus; two thirds of the students live there. Seek the advice of local planning officials and campus deans. A real estate consultant or housing expert may be brought in to help measure the adequacy of the existing supply and to project future requirements, especially costs. Use census materials. As part of their student counseling work, many institutions accumulate and disseminate information on off-campus housing accommodations. These files should be consulted and used in the survey.

Map and classify housing information to show at least the following: (a) where people live; (b) the types of accommodations used; (c) the conditions of the housing; (d) the price paid. This material lends itself to automatic data processing. If considered as a perpetual inventory and revised annually, it will track land-use changes, and community development trends, as well as housing characteristics. Professionally interpreted, the inventory will also be useful in determining parking policies and estimating overall circulation needs, since it will help show how many people live within walking distance of the campus and indicate the areas from which the heaviest traffic is liable to flow towards the campus, i.e. the journey-to-work pattern.

Several schools have taken good advantage of this data in their recent planning. A housing study at the University of Wisconsin disclosed a heavy concentration of private boarding houses south of the campus. Any expansion in this direction would require the replacement, in kind, of any housing removed—a factor which could eliminate or postpone construction in that area since the housing provided is less expensive than any which could be built or operated. A study of housing costs, as well as commuting patterns in Westwood, demonstrated to the UCLA administration the urgent need for more campus housing because the cost of housing in the environs had become too expensive for the average student. At a private institution in the East, a high vacancy ratio was found in good housing areas close to the campus. An ambitious scheme for new faculty housing was accordingly cancelled since modest investments in local real estate and a low interest mortgage scheme would meet the institution's objectives of providing reasonably priced housing for young, tenured professors. These are a few examples of useful information uncovered through intelligent handling of programming data in such a survey.

Whether or not a detailed study of housing is made, these three functions should be reviewed as to policy: (a) the function and relationship of housing to the academic program; (b) the social function of housing, i.e. housing as the living environment—amenities of rest and recreation; (c) the economic function of the institution to provide facilities to meet its own housing needs in localities where the supply is short or beyond the means of student and faculty.

Against the background of availability and adequacy of future housing supplies and educational and social goals, a two-part program can be arranged: housing to be constructed by the institution itself; and housing which it would encourage others to provide. The encouragement may take the form of participation in urban renewal, joint ventures in non-profit, co-operative or limited dividend housing, the provision of credit or land for construction, or simply making known to private enterprise the extent of its housing needs off campus.

2. ESTIMATE QUANTITIES AND TYPES OF CAMPUS HOUSING NEEDED FOR LONG-RANGE PLANNING

Having tentatively identified the general obligations which the institution is willing to assume, the next step is to calculate preliminary estimates of the required numbers and types of accommodations. Not all institutions will support all types of housing. The percentage of types will also vary from one institution to another. Use the list on page 135 as a starting point in sorting out the types of accommodations to be included in the plan.

In organizing space programs for each area of housing to be provided by the institution, include these considerations:

a. Number of people to be housed
b. Types of accommodations
c. Gross estimate of living unit space to be allocated per type of user
d. Organization of individual units by desired grouping of units
e. Common and educational facilities to be included: lounges, meeting rooms, snack bars, mail rooms, reading rooms, play rooms, dining facilities, outdoor recreation areas and others
f. Service and housekeeping areas

Make allowances for existing housing and housing which may have to be replaced because of obsolescence, safety or other reasons. Translate gross square footage requirements into building modules, following the system described in Chapter 2. Use planning standards on page 137, when local

ndards are not available. Since all the using in the development plan will probably not be built at one time, arrange housing programs by target dates or in sequence of development.

3. SITE ARRANGEMENTS

Housing modules will be located on the basis of individual site considerations and programs. The following trends should be examined as to their applicability on any one campus:

a. Male and female units are being combined on a single site. This has the advantage of flexibility, allowing assignment of housing units to fluctuate with changes in enrollment and housing needs. It is said that the proximity of male and female is a civilizing influence on both sexes, reducing rowdiness and encouraging the social graces.

b. Rather than concentrated housing in a single area, units are being dispersed throughout the campus. This, too, has the advantage of flexibility as it can create a mosaic pattern of intensive uses and green spaces, the green spaces being land reserves for unknown expansion needs, but meanwhile serving as recreation areas.

c. Single student housing, graduate student housing and married student housing are usually separated from one another, the general opinion being that social and living patterns of each group might be in conflict.

d. Some married student housing is being sited off campus near existing neighborhoods which can supply the requisites of family life, such as shopping centers, schools, and other typical residential needs.

e. High-rise housing patterns have come into favor on a number of campuses, particularly in urban areas where land costs are high and the acquisition of land for horizontal patterns is difficult.

f. Generally housing is being kept out of the central campus areas and placed on the periphery. This segregation of land uses assures long-range land reserves for expansion of academic buildings and core facilities such as libraries, unions, and other central structures.

Table 14
Check Lists for Projecting Gross Square Footage Requirements for On-Campus Housing

PLANNING INDEX TO FACILITY TYPE[a]	PLANNING STANDARD GROSS SQUARE FOOTAGE PER LIVING UNIT[b]
A. UNDERGRADUATE HOUSING	
1. Single Male	212[c]
2. Single Female	253[d]
3. Married Students, no children	360 plus bath[e]
4. Married, with children	680 plus bath[f]
5. Housemothers	600 plus bath[g]
6. Tutors (bachelor)	320 plus bath[h]
B. GRADUATE AND SPECIAL	
1. Single Male	212[i]
2. Single Female	253[j]
3. Married, no children	667[k]
4. Married, with children	680 plus bath[f]
C. FACULTY	
1. Bachelor	420 plus bath[l]
2. Married, no children	680 plus bath[m]
3. Family Units	760 plus bath[n]
4. Professor Emeriti	760 plus bath[n]
5. Artist in residence	680 plus bath plus studio[m]
D. ADMINISTRATION AND STAFF	
1. President	Special[o]
2. Deans	Special[p]
3. Chaplain	Special
4. Maintenance Staff and Operations	230 plus bath[q]
5. Visitors	255 plus bath[r]

FOOTNOTES TO TABLE 14

a. The list does not exhaust all the possibilities, but will assure a balanced coverage.

b. A living unit is defined as the space per user for all uses associated with residential buildings. All square footages are suggested by the author as being minimum for long-range planning purposes. Sources are shown below.

c. Average 230 projects studied by Riker and Lopez.

d. Average 180 projects studied by Riker and Lopez.

e. Minimum space standards for efficiency units under mortgages for general housing purposes administered by Federal Housing Agency.

f. Minimum two-bedroom living unit standards for general housing mortgages administered by Federal Housing Agency.

g. Minimum one-bedroom living unit standards for general housing mortgages administered by Federal Housing Agency.

h. Minimum housing standard for single person under Section 213 Housing Act, 1950, amended (cooperative housing), plus study.

i. No less than single student standards.

j. No less than single student standards.

k. Average standards from projects studied by Riker and Lopez.

l. Minimum standards one-bedroom unit for general housing mortgages administered by Federal Housing Agency plus space for a study.

m. Minimum standards one-bedroom units for general housing mortgages administered by Federal Housing Agency, plus space for a study.

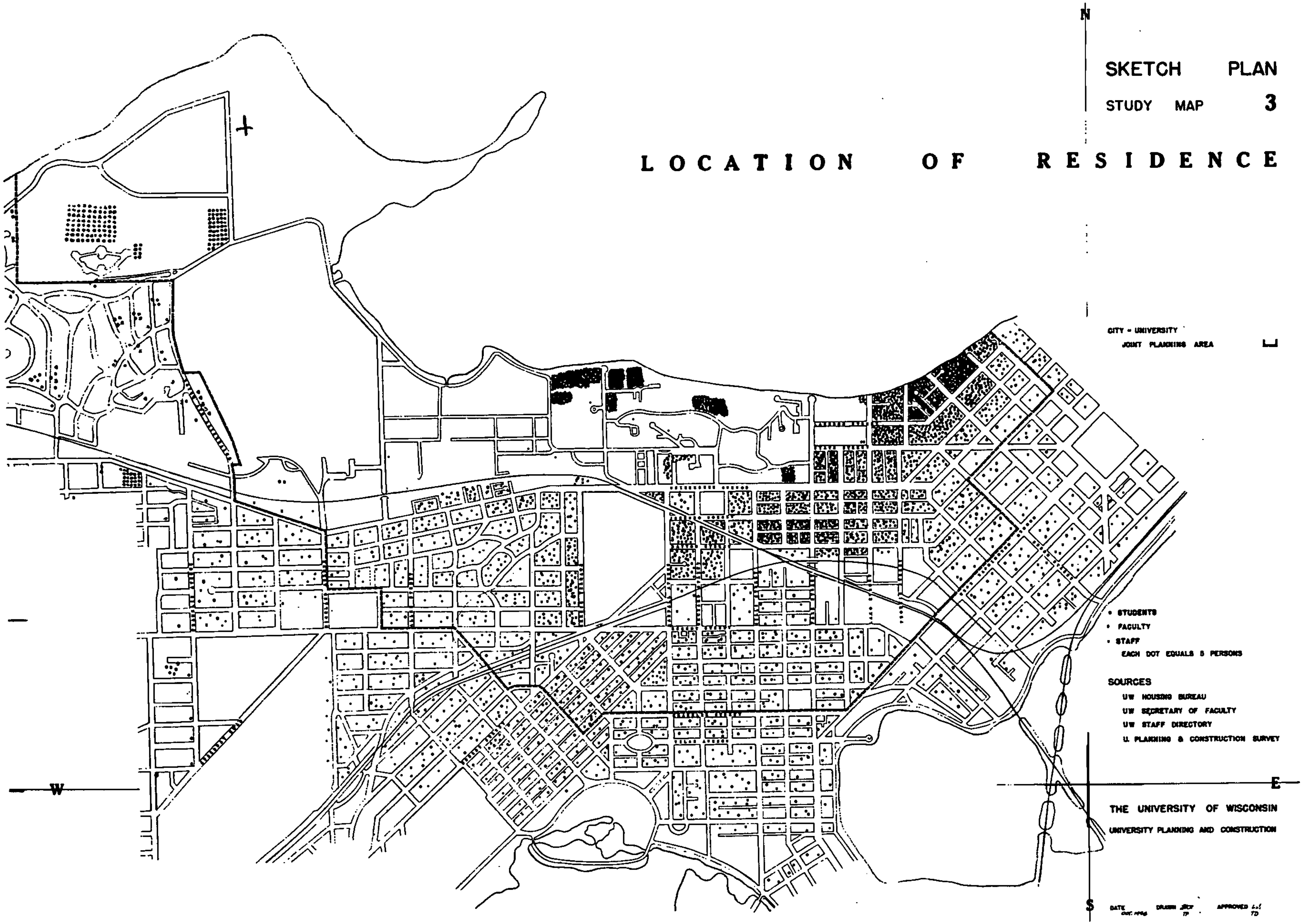
n. (m) above, plus additional bedroom.

o. Requires large spaces for entertaining.

p. Requires large spaces for entertaining, but smaller than o.

q. Minimum standard efficiency unit for single person under mortgages administered by Federal Housing Administration.

r. Double-room size, hotel standards.



22

22

This map was prepared by the University of Wisconsin Planning Office as part of the analytic studies used in developing a sketch plan for the University growth. The study substantiated an earlier hypothesis about the boundaries of the University's zone of influence. The housing study indicated that 40 to 60 per cent of the residents in the area had University affiliation. The relative location of faculty and student housing was useful in charting possible expansion areas for various types of housing.

E COST OF HOUSING

. all campus buildings, housing shows the greatest range in cost of construction. In their report, "College Students Live Here," Riker and Lopez identified these items as constituting total costs for residential projects: land, construction, movable equipment, utility and service connections, occupancy costs, professional fees, interest on loans and contingencies. Their analysis of 469 college housing projects, financed by the Community Facilities Administration of the United States Housing and Home Finance Agency and built in the five years prior to 1960, indicated an average unit cost of $4,400. Recently, privately financed units have cost as much as $16,000 each. These figures refer to undergraduate housing.

Analytical data in *The Costs of Higher Education in California 1960-1970*[14] indicates that with a constant percentage housed, the estimated cost of expanding an existing campus compared to that of developing a new campus varies so little that such factors as land costs could tip the scales either way. If, however, the alternative to new campus development involves a significantly greater percentage of students housed on expanding campuses, then the differences in capital outlay generally is clearly in favor of the development of new campuses.

Construction costs will vary from region to region depending upon wage patterns for labor, price of materials, differential in the loan rates and financing fees, and, most important of all, the quality of accommodations proposed. As a rule of thumb, this has proven true as shown by the author in a random selection from across the country of project costs from 1958 to 1961: faculty housing will cost about half as much again as for married student; married student housing will cost about twice as much as single student housing; and dormitories for women will cost as much as twenty per cent more than men's.

To a large extent, program decisions on the amount of housing to be included in development and comprehensive plans will ultimately be tailored by balancing anticipated funds for construction against total aspirations. In estimating the sources of income for housing, include such possibilities as: income from operations, gifts, bequests, long-term loans, special capital improvement drives, government grants and other financial assistance.

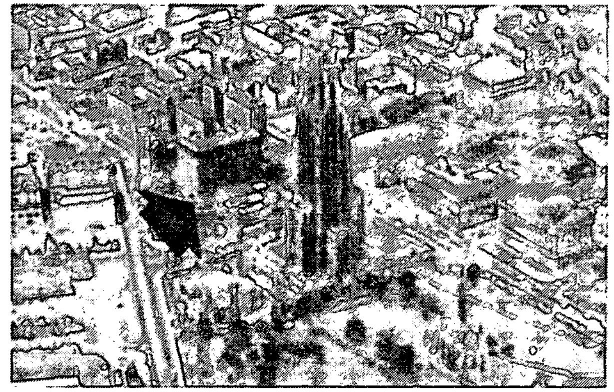
23A
Housing at the University of Pittsburgh
Until 1957, the University of Pittsburgh could house only 70 students on its campus. Recognizing the need for residential facilities in order to bring students closer to the campus, the University purchased the Schenley Apartments, a complex of five buildings shown just left of the Cathedral of Learning. (Air photo) Four of the buildings have been renovated to accommodate 1,400 students.

Located between the new Schenley Quadrangle and the tower, is Schenley Hall—the former Schenley Park Hotel. The upper five floors contain dormitory space for 255 students. The lower floors provide student union facilities, cafeteria and dining room space. Cost of renovation, $1.5 million.

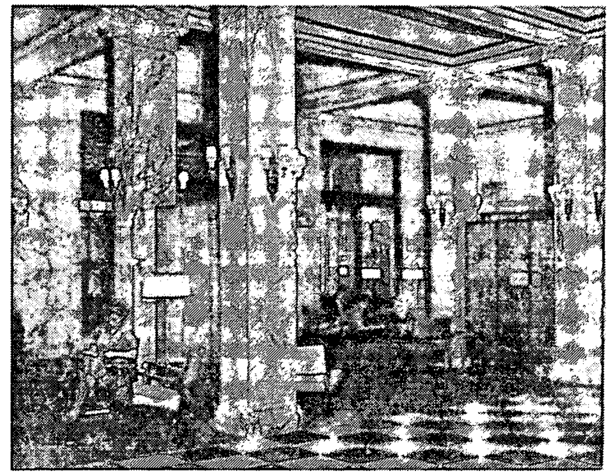
23B
Student lounge in Schenley Hall

23C
Proposed dormitory complex for 1,900 students

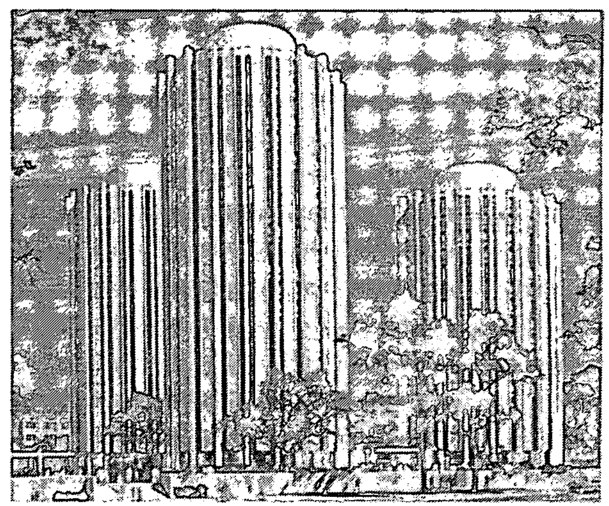
PHOTOGRAPHS: COURTESY OF UNIVERSITY OF PITTSBURGH



23A



23B



23C

SOME EXPECTATIONS

For both qualitative and quantitative reasons housing will continue as a central element in campus planning. To an extent not previously considered possible, housing promises to be an integral part of campus development in the decades ahead. These issues, however, seem no closer to resolution than they were three hundred years ago. Housing may be constructed for economic survival, or as a social responsibility, or as an adjunct force in education. Because American higher education thrives on diversity, perhaps no single housing pattern is needed.

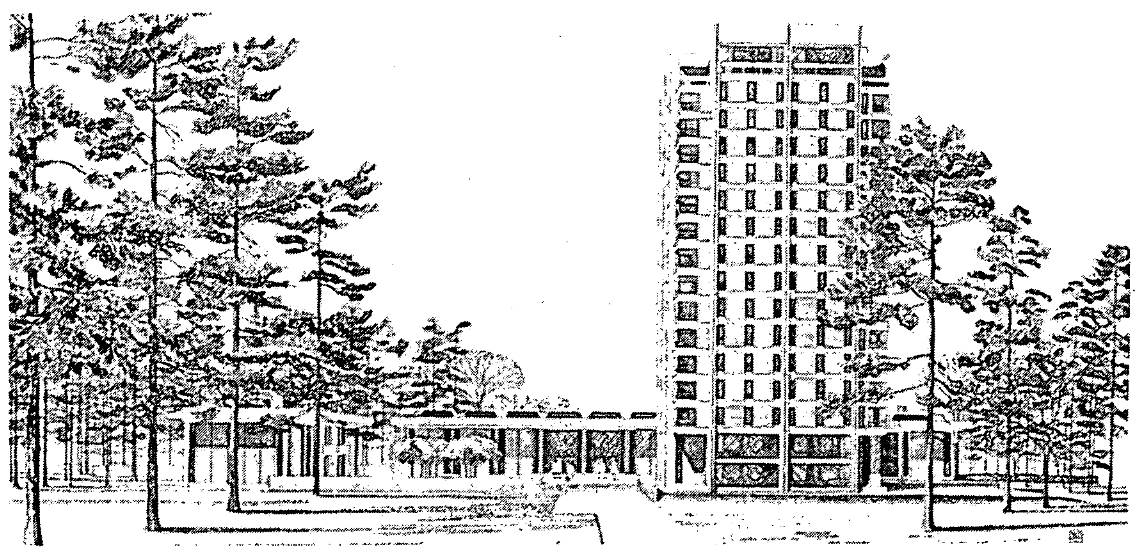
High estimates of housing requirements should be used in preparing long-range plans. Institutional expenditures for this purpose will go beyond the levels optimistically being considered today. The reasons are:

1. The strong movement towards greater self-learning, which can be achieved in part through a better housing environment, will eventually result in a higher percentage of students housed on campus.
2. To prevent the formation of an elite-education concept and greater divergence between public and private educational goals and systems, tax supported schools will have to keep up with the private schools in providing housing; or invent curricular and instructional methods that can duplicate the high academic returns expected from a residential education.
3. As the base of education spreads to include a higher percentage of the population seeking first degrees, so too will the percentage of people seeking second and third degrees rise. This has been the consistent pattern in American education, as seen in the enrollment profiles and statistical relationships between grammar school certificates and high school diplomas, then high school diplomas and college degrees. Heavier enrollments in graduate education, and a continuance of the present marriage and birth rates among students, will result in increased housing needs for this group. To attract and hold graduate students, institutions will have to subsidize its housing.
4. There is no evidence to date that fraternity and sorority systems will be able to continue to house the same percentage of students as they have in the past. The institution may have to pick up the difference between the percentage of students now housed by fraternities and sororities, and the percentage they will be able to house in the future.
5. The small college may have to use housing as a means for economic survival. At Parsons College, housing has been operated at a profit because of tight administrative control. The profits in turn have been plowed back into faculty salaries; the school now pays the second highest liberal arts salaries in the country. Higher salaries have enabled the school to obtain first-rate faculty and in turn to attract better students. An increase in enrollment has meant an increase in housing units operated, and in turn more profits. The success of Parsons College is due in part to an administrative decision to exploit housing skillfully, but these factors too have been key points in keeping the cycle going:

a. An aggressive admissions program
b. A continuing emphasis on academic excellence
c. An interesting college environment, in which housing plays an important role
d. A student aid and work program

24
Bowdoin College Senior Center (1962)
Brunswick, Maine
Male
Private
Spring 1962 enrollment: 810 students
Architect: Hugh Stubbins and Associates

The sixteen story tower will accommodate 200 senior students in an educational environment intended to help make the transition from college life to professional careers or advanced study. The center includes facilities for teaching fellows and visitors, as well as dining hall, lounges and seminar rooms.
PHOTOGRAPHS COURTESY OF BOWDOIN COLLEGE



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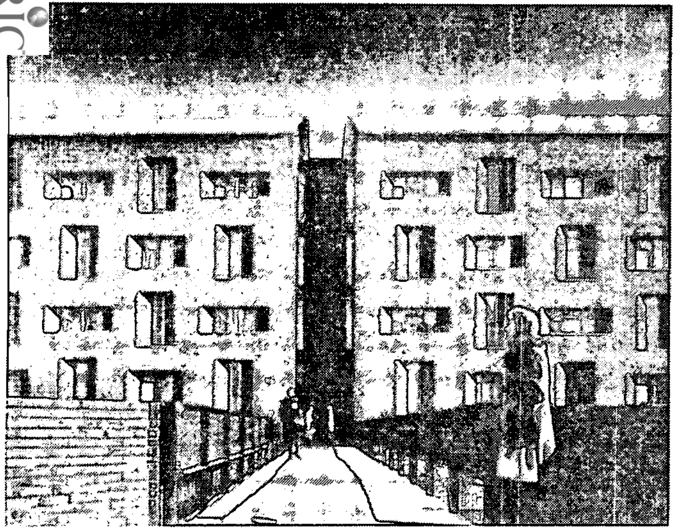
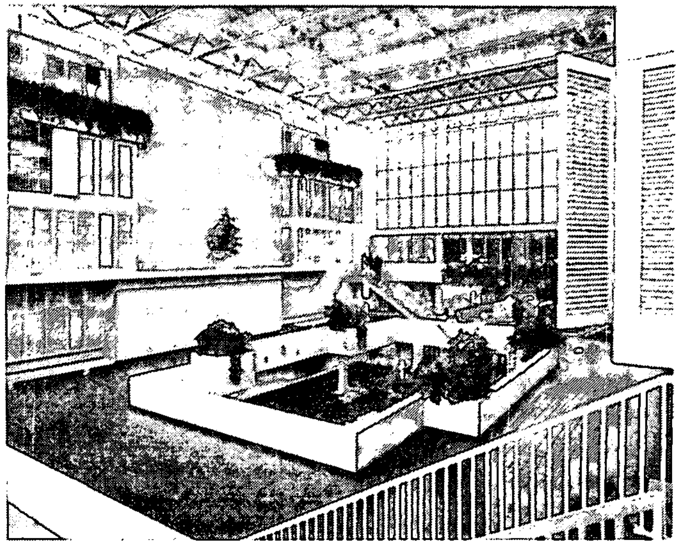




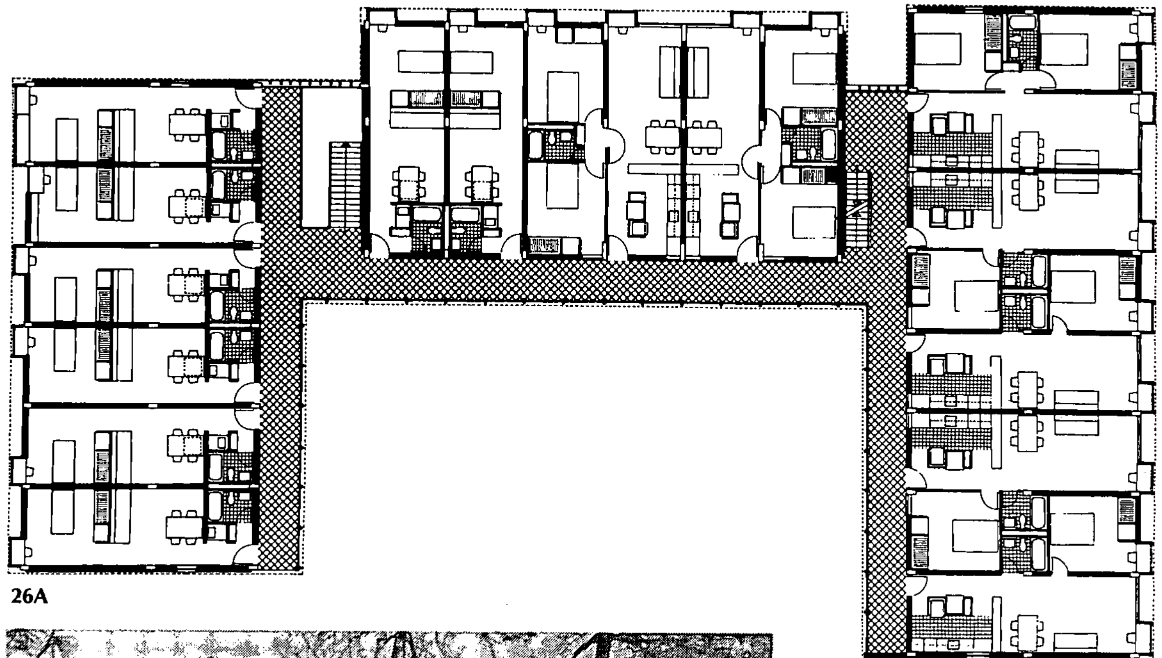
25 B

25A, B
Women's Student Housing (1960)
University of Pennsylvania
Architect: Eero Saarinen & Associates

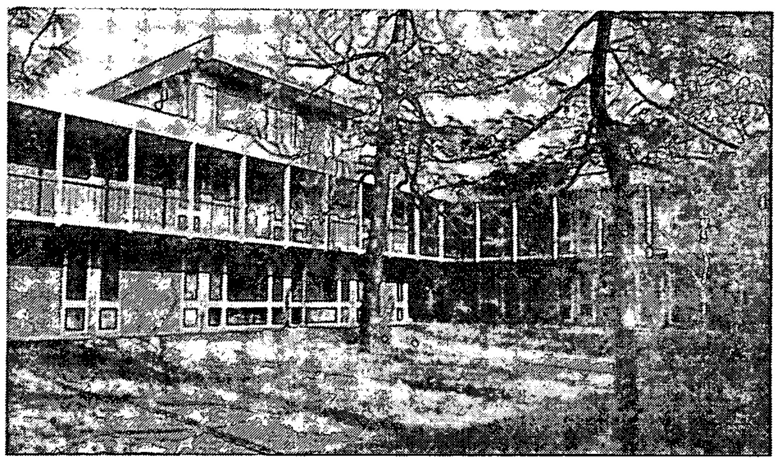
Because of its location in an industrial like area, this dormitory facility turns its back to its environs by creating a special interior communal space, around which the dormitory rooms are organized.

PHOTO 25A: LAWRENCE S. WILLIAMS
PHOTO 25B: BALTAZAR KORAB

26A, B
Center for World Religions, Harvard University (1960)
Architects: Sert, Jackson and Gourley
Landscape Architects: Sasaki, Walker and Associates, Inc.



26A



26B

DINING FACILITIES IN HOUSING AREAS

The origins of food services in colleges and universities are not exactly known. Stokes[15] states, "Plato is said to have entertained favorite students at dinner in his home following his dialogues at the Academy." Early European universities had no facilities for feeding students. The American traditions can be traced directly to Cambridge and Oxford. At the English schools, what began as a simple evening meal shared by all in common, soon became an elaborate ceremony. Special buildings were constructed for that purpose, hence the word *commons*.

In *Diets and Riots*, A. M. Bevins tells how the students were fed in the early colleges in the United States. Food was scant, poorly cooked and badly served. Undergraduates ate what there was, but always in protest. Christian Gauss described the menu at Harvard during Josiah Quincy's term as president (circa 1830): coffee, rolls and butter for breakfast; and an evening meal just as plain—tea instead of coffee and "cold bread the consistency of wool." The histories of many schools are filled with similar stories. The notoriety of college fare accounts in part for the popularity of eating clubs, fraternities and sororities. It was not until late in the 19th century that significant reforms were made in food service.

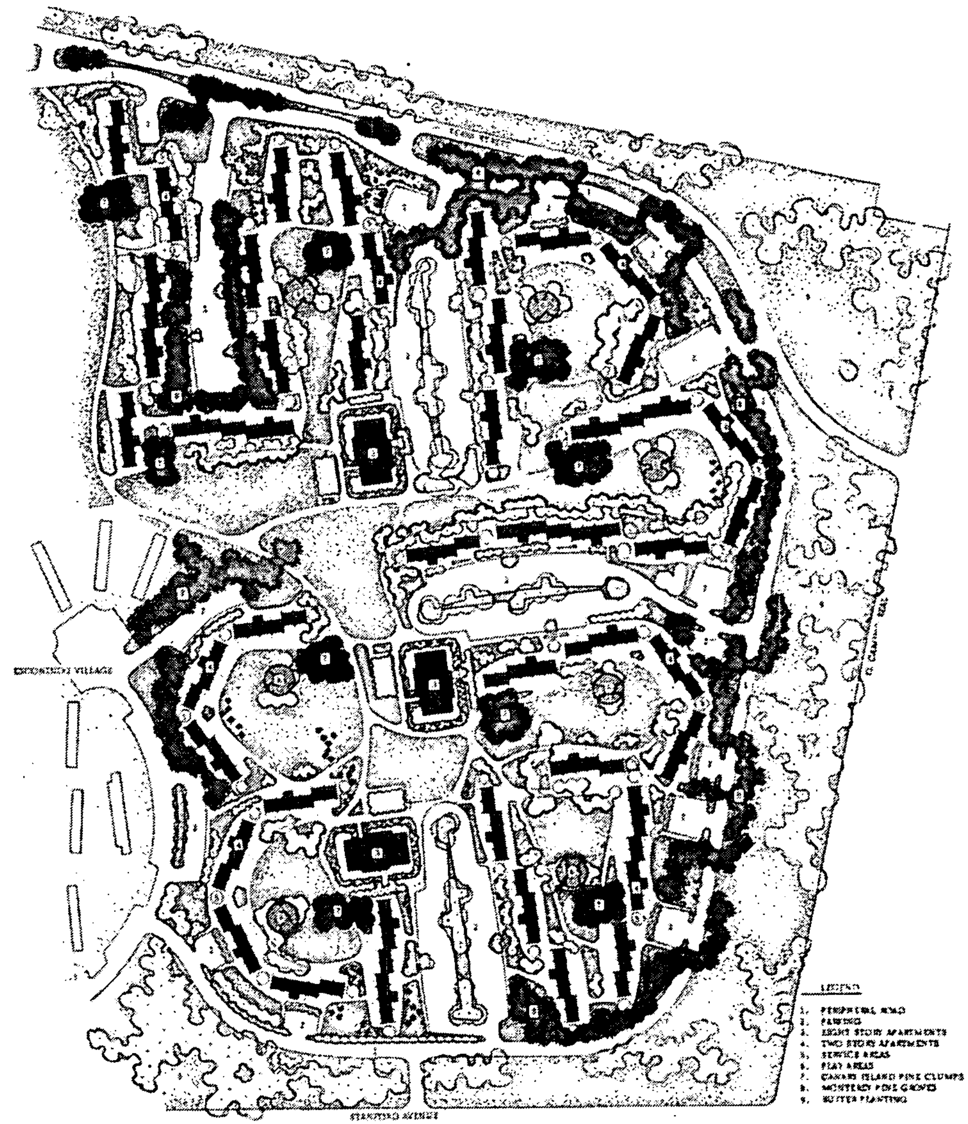
The design of dining facilities reflects the advances that have taken place in the preparation and serving food. Significant operational changes have been:

a. the application of nutritional science in selecting menus and preparing food.

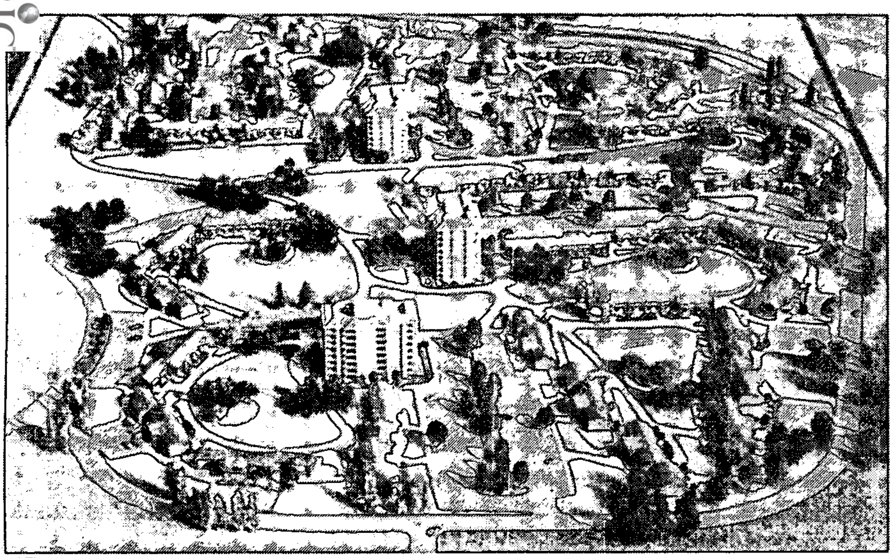
b. the change from table service to cafeteria service.

c. the introduction of labor-saving equipment.[15]

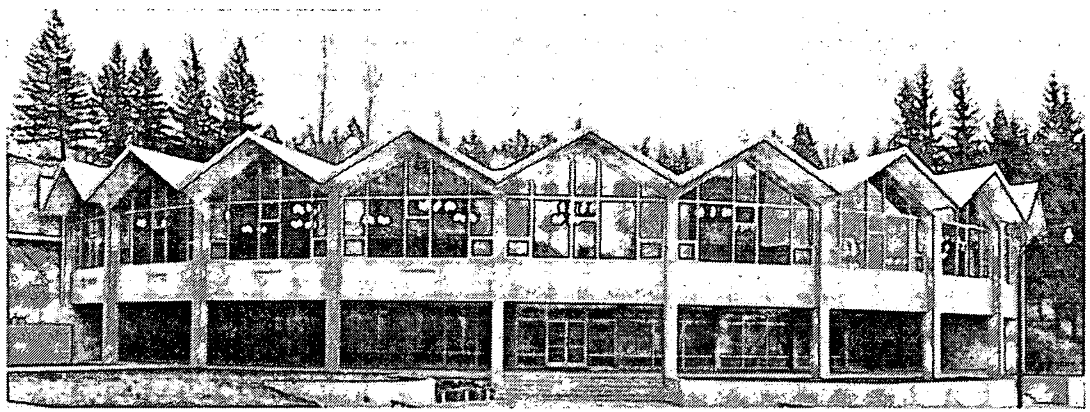
These changes occurred in part for economic reasons. Stokes estimates that 25% of the institution's annual operating budget is involved in food service. Significant savings can be made through better administrative control over the management and operation. In some sections of the country institutions no longer manage their own food services, but have found it profitable to use catering firms on contract basis to operate their dining halls.



27A



27 B



28

27A, B
Married Student Housing (1962)
Stanford University
Stanford, California
Campbell & Wong & Associates, Architects
Royston, Hanamoto, Mayes & Beck, Landscape Architects

Development of an environment for the family grouped around sizeable common recreation spaces was a principal objective of the project. The two story apartments define these landscaped spaces with private terraces, play areas, pedestrian and bicycle circulation, all directed inward. These spaces open to a common area located near the site for future housing and the academic campus. Automobile traffic, front entrances and service units are kept to the outer edge to avoid the conflict of service functions and recreation.

The site is approximately 39 acres with 29 acres of landscape area. The 41 two story apartment buildings provide 273 two and three bedroom apartments for families with children. The 3 eight story buildings provide 186 one bedroom apartments for a total site population of 459 units, a density of 11.8 units per acre.

PHOTO 27B: COURTESY STANFORD PLANNING OFFICE, STANFORD UNIVERSITY

28
Stanton J. Hall Rotunda (1961)
Washington State University
Pullman, Washington
Public
Co-educational
Enrollment Spring 1962: 7,311
Architects: Lea, Pearson & Richards

Facility serves as kitchen and dining room for men's dormitory. Seating capacity, 870.

PROGRAMMING AND PLANNING MODULES

The two component parts to the dining facility are the dining area itself and the kitchen. The size of the dining area depends on

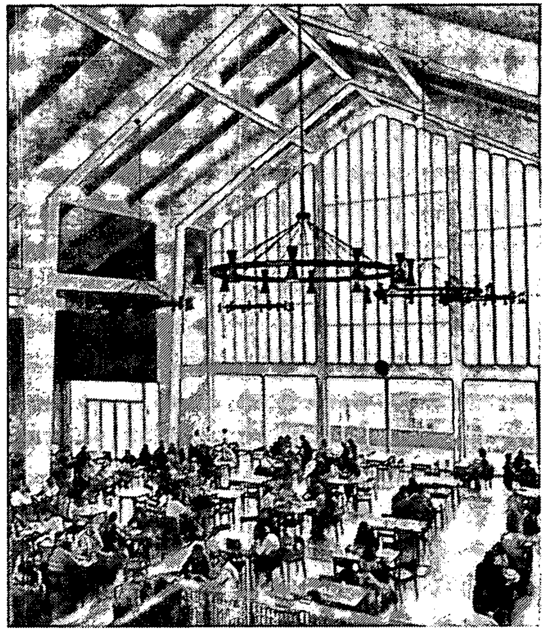
(a) the type of service
(b) menu type
(c) number of people served

To prepare a planning module for the dining area, allow 18 square feet per person served for table service, and 15 square feet per person served for cafeteria service. Estimate maximum capacity. For a cafeteria system the average time spent in line selecting food, eating, and returning the tray is 30 minutes. During an hour and a half meal period and under relaxed conditions, the campus dining room can be used twice. Thus, a facility designed for 200 people can accommodate 400 people. Stokes[16] suggests a 3:5 proportion for designing a cafeteria style dining room. This allows a waiting line on the long side.

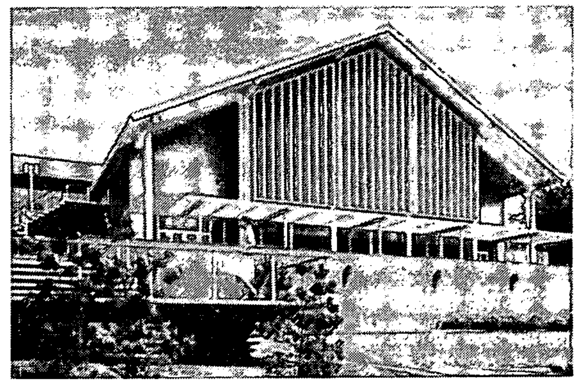
A module for the kitchen space requirements can be estimated on a per meal served basis.[17]

MAXIMUM MEALS PER HOUR	SQUARE FOOTAGE SPACE PER MEAL SERVED
200 or less	6
200 to 400	3.5
400 to 800	2.7
800 to 1300	2.5
over 1300	2.0

Project design for efficient eating facilities is a highly technical matter, but the above planning standards will help establish a reasonable planning module. Site selection is equally as important as the facility design. Allow adequate space for the delivery of foodstuffs and supplies, and the hauling away of garbage and refuse. Because two out of three meals are served before and after scheduled classes dining facilities for residential areas are located as close to the dormitories as possible. Environmental factors also affect location. Light, air, and freedom from disagreeable odors are necessary to the operations of this kind. Dining areas should be sited to take advantage of the most pleasant surrounding views. Exterior and interior noise should be reduced to comfortable levels. Any nuisances and heavy activity that can be viewed from the dining rooms should be screened out architecturally, or through the placement of landscape elements as outdoor screens.



29A



29A, B
Refectory (1959)
Rhode Island School of Design
Architects: Robinson, Green and Beretta
Design Consultant: Pietro Belluschi
Landscape Architects: Sasaki, Walker & Associates, Inc.
PHOTOGRAPHS BY: JOSEPH W. MOLITOR

FOOTNOTES

1. Brubacher, John S. and Rudy, Willis; "Higher Education In Transition"; New York; Harper & Brothers; 1958, p. 41.

2. Brubacher and Rudy, p. 54.

3. Gauss, Christian; *How Good Were The Good Old Times?;* "The College Years"; edited by A. C. Spectorsky; New York; Hawthorn Books, Inc.; 1958, p. 84.

4. Brubacher and Rudy, p. 325.

5. Burchard, John and Bush-Brown, Albert; "The Architecture Of America"; p. 290; Boston, Little, Brown and Co.; 1961.

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7. Lowell, A. Lawrence; "At War With Academic Traditions In America"; Cambridge; Harvard University Press, 1934, p. 34.

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10. "American Architecture 1891-1941," Part II; *Architectural Record;* February, 1941, pp. 33-112.

11. Annual Survey "College And University Business"; New York; Buttenheim Publishing Co., 1959.

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13. "Report Of The Committee On Student Housing"; M.I.T., Photographic Service, 1956.

14. "The Costs Of Higher Education In California 1960-1975." Liaison Committee of the Regents of the University of California and the State Board of Education. Berkeley and Sacramento, 1960.

15. Stokes, John W.; "Food Services In Industry And Institutions"; Dubuque, Iowa; Wm. C. Brown Company, Publishers, 1960. The best single source on the subject.

16. Ibid.

17. Ibid.

OTHER SOURCES

The two best sources for programming housing are self-studies made by the institution of its own housing patterns and standards; and secondly, on the site evaluations of housing on other campuses.

The following books and reports will also be helpful. "Planning Functional College Housing"; Harold C. Riker; Teachers College, Columbia University, 1956.

A pioneer effort. Excellent in its discussion of administrative procedures and basic programming steps. Concerned mostly with single student campus housing. Examples outdated as to design.

"College Students Live Here"; Harold C. Riker with Frank G. Lopez; Educational Facilities Laboratories, Inc., 1961.

Excellent in its graphic presentation of the varieties of college and university student housing. Statistical material rather vague and occasionally inaccurate. Much better as a design primer than a study of the economics or the sociology of student housing.

"College Housing"; American Institute of Architects, Washington 6, D.C., 1956.

Contains a good bibliography. Valuable exposition on dormitory architecture. Standards and examples slightly dated.

"Housing Design"; Eugene Henry Klaber; Reinhold Publishing Corp., 1954.

The standard work now in print. Elementary and thorough. Not directly pertinent to student housing, but useful as an introduction to housing as architecture. Site design concepts are dated.

"The House And The Art Of Its Design"; Robert Woods Kennedy; Reinhold Publishing Corp., 1953.

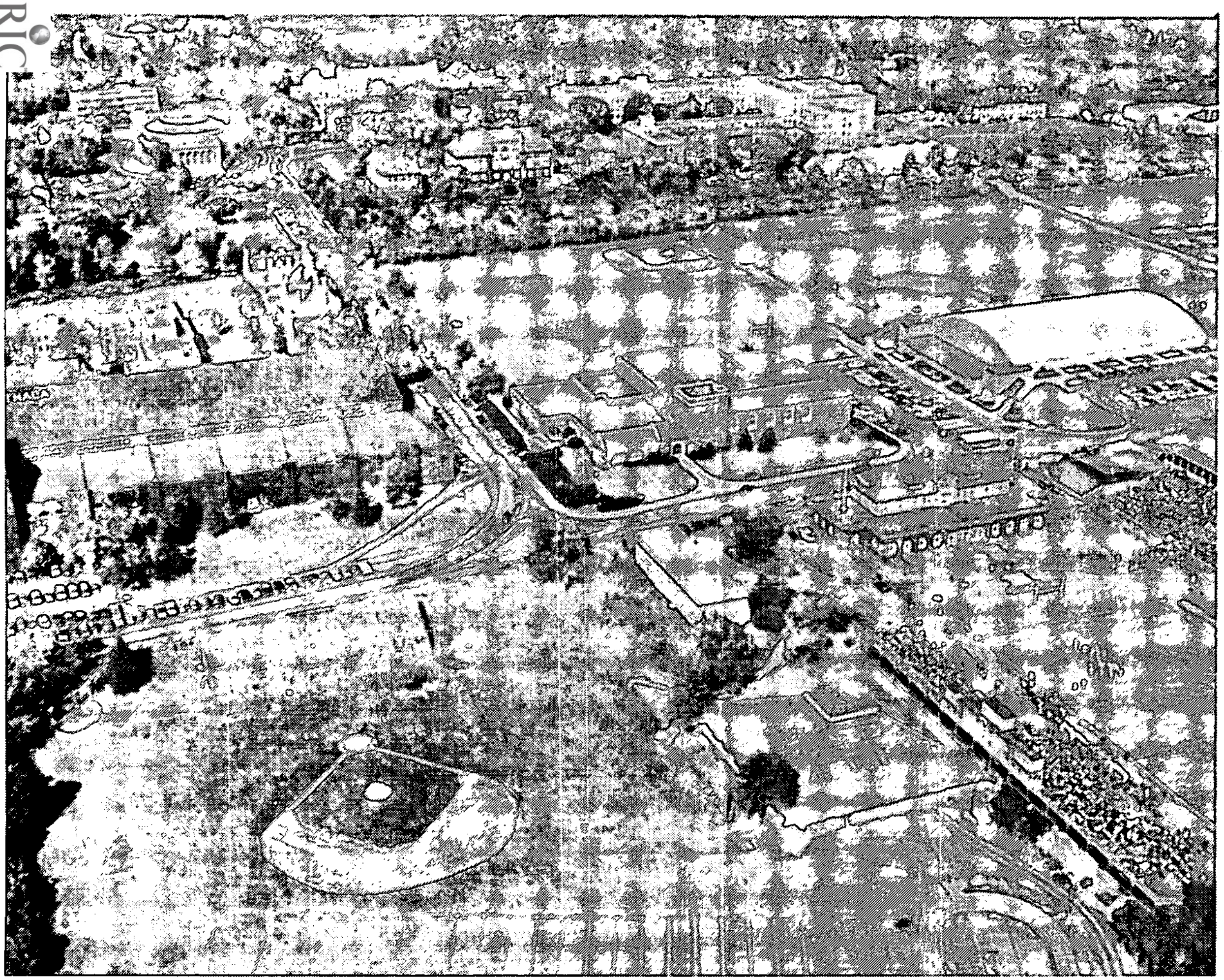
Through focusing on the single family house, the book delightfully illustrates the basic human needs that must be satisfied in all housing.

"Methods Of Reducing The Cost Of Public Housing": School of Architecture, Pratt Institute; Brooklyn, N. Y.; 1960.

An informative guide to contemporary practices in multi-family unit construction. Recommended for insight it affords on the technology of large-scale housing.

"Housing Choices And Housing Constraints"; by Nelson N. Foote, Janet Abu-Lughod, Mary Mix Foley, Louis Winnick. McGraw Hill Book Co., Inc., 1960.

An incisive accounting of past and emerging tastes and preferences in housing. Not immediately pertinent to student housing, but informative and applicable in other aspects of the campus housing program.

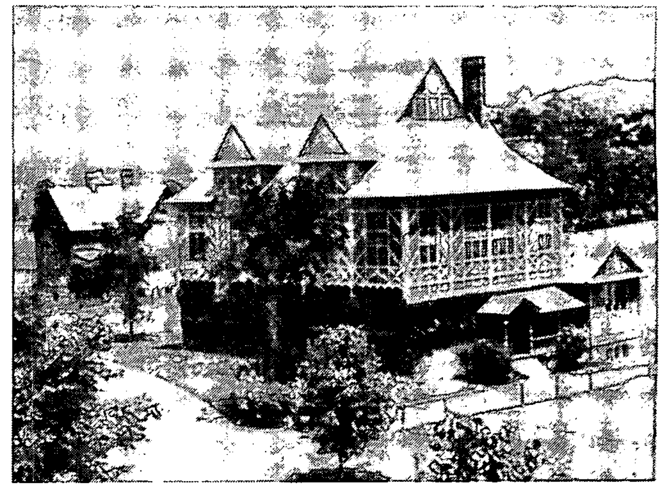


1

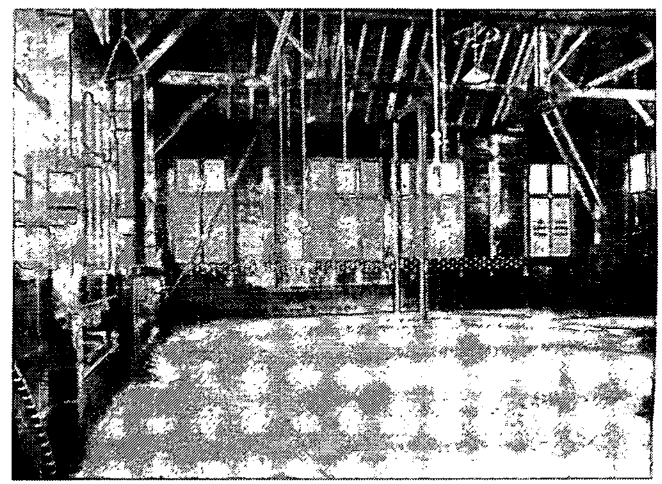
Cornell University's Sports and Recreation Plant

The 52 acre outdoor playing space and buildings of Cornell University's sports and recreation plant. Not shown are the golf, rowing and skiing facilities, all within five minutes of the campus. The three large buildings shown left to right across the photo are: Barton Hall, which encloses 1.8 acres of playing area; Teagle Hall, containing gyms, swimming pool, and other rooms which can accommodate 2,500 men at one time; Lynah Hall, a 4,200 seat indoor hockey rink. Clockwise around the end zone of the football field: Bacon Cage; Grumman Squash Courts; Schoellkopf Hall, which was the first permanent physical education building on campus, and once housed all the sports activities.

PHOTO COURTESY OF CORNELL UNIVERSITY ATHLETIC ASSOCIATION



2A



2B

Gymnasium, Gallaudet College (1881)

One of the first complete physical education plants was constructed at Gallaudet College (1881) at a cost of $14,000. The upper gymnasium measured 75 by 60 feet. The swimming pool on the first floor was 26 feet by 40 feet; 8 feet deep at one end and 4 feet at the other. The old plant shown above has since been replaced with a new building, but the structure continues in use. The swimming pool has been filled in and is now used as a printing office. The college wrestling team still uses the top floor.

GALLAUDET PHOTOS COURTESY: ROY J. STEWART

2A

Gymnasium Gallaudet College

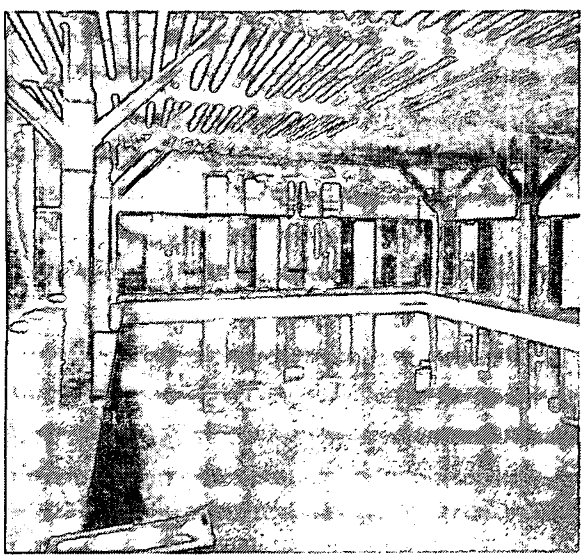
2B

Interior of Gymnasium, Gallaudet College

2C

Swimming pool, Gallaudet College

8. Sports, Recreation and Physical Education



2C

SPORTS, RECREATION AND PHYSICAL EDUCATION

American higher education encourages the elementary dictum that a sound mind needs a sound body. There has been a progression from "jumping rope, swinging on rings, and playing town ball"[1] to elaborate buildings and large budgets for carrying on sports, recreation and physical education activities. Currently there are five distinct functions for which facilities are provided on campus.

1. *Physical education and hygiene:* These are scheduled courses of instruction in the development of physical skills sufficient to maintain a reasonable degree of body fitness, to improve neuromuscular functioning necessary for active recreation, and to correct physical defects that respond to therapeutic exercise. Hygiene courses include instruction in proper health habits, prevention of infection, and the science of nutrition.
2. *Intra-mural sports:* Intra-mural activities afford an opportunity for participation in scheduled group games and individual sports of a competitive nature, under the supervision of trained coaches and instructors.
3. *Intercollegiate athletics:* These are activities predicated on the assumption that competitive games between amateur teams representing the schools involved contribute to the health of the participants and the morale of the student body, and sustain alumni loyalty as well.
4. *Informal recreation and sports:* Recreational activities in which skills and performance are secondary to participation and social intercourse.
5. *Instructional courses in preparing physical education teachers:* Teacher preparation includes training for professional careers in coaching, instruction in physical education in schools and colleges, and the administration of physical education and recreation programs.

In 1930 only seven states had regulations requiring public schools to include physical education programs in their curriculums. Now almost all states have such laws.

The above programs are not supported equally by all institutions. Generally all schools require some participation in physical education and hygiene as part of the compulsory requirements for graduation. The greatest differences between the schools are the degree of participation in intercollegiate sports and the training of physical education teachers.

Like many campus functions, facilities for sports, recreation, and physical education have tended to become more specialized and devoted to a single purpose, rather than sheltering all activities under one roof. The major facility types are:

1. *Swimming pools and related facilities.*
2. *Gymnasiums.* Buildings which combine classrooms and play areas for instruction in such sports as gymnastics, basketball, badminton, fencing; faculty offices and locker rooms; storage and service spaces; and occasionally spectator spaces and ticket offices.
3. *Stadiums.* Outdoor arenas for intercollegiate athletics.
4. *Field spaces.* Outdoor areas for competitive games such as baseball, soccer, football, field hockey and others; including tennis courts, archery, running track and related facilities, and occasionally golf courses.

FACILITIES: EARLY MODES AND LATER MODELS

The swimming pool

Benjamin Franklin wrote the first systematic American treatise on the place of physical education in the curriculum in his "Proposals Relating to the Education of Youth in Pennsylvania" (1749). Eighty years passed, however, before a special facility was designed for sports. Perhaps Franklin's fame as an international long distance swimmer popularized his cause, for the first physical education facility constructed on campus was a swimming pool: four over-sized bathtubs at Girard College. Gallaudet College built the second swimming pool in 1881; by 1900 four more had been erected at Harvard, Yale, Princeton and the University of Pennsylvania.[2]

The first facilities didn't contribute to the students' health directly. Studies carried out in the early 1900's, when the swimming pools served as biological research stations for public health investigations, indicated that the facilities were a source of widespread contagion. In tracing the spread of certain sicknesses to and from the swimming pools, researchers confirmed the germ theory of disease.

These medical discoveries led not only to extensive reforms in the design of all recreation and sports facilities, but in turn engendered significant changes in campus architecture. New mechanical equipment for filtering water and improved sanitary codes resulted in cleanly articulated and strikingly functional interiors — a concept which was carried throughout the interiors of other sports buildings when they became more complicated in design and larger in size to accommodate a greater variety of sports and seating arrangements for spectators. In the 1920's, though moulded on the exterior with eclectic mannerisms, the interiors of several gymnasiums dramatically forecast one of the first 20th century contemporary campus buildings — the M.I.T. swimming pool (1938) by Lawrence B. Anderson. Holabird, Root & Burgee's swimming pool (1941) at Northwestern, though lacking the exterior simplicity of the M.I.T. pool, is another early example of function affecting form.

Gymnasiums and Stadiums

The first college to set up a gymnasium was Harvard. "In the year 1826 one of the dining halls served as the place of beginning."[3] Later, (circa 1840) a separate structure was erected, also the first of its kind. Physical education in the early 19th century was encouraged to work off the students' excess energy rather than to improve their health (though some advocates reasoned outdoor recreation as essential in holding off "the hectic growth of consumption's hidden fire."). Physical exercise was also a favorite means of discipline.

Organized physical recreation starting in 1830, consisted mainly of gymnastics; first, the mass drill and use of heavy equipment introduced by Carl (sometimes called Charles) Follen, a German immigrant physical education instructor. Later formal drills were replaced by the more popular Swedish exercise, which had less militaristic overtones in its performance and teaching methods. Early gymnasiums were no more than large sheds, composed of several rooms equipped with hanging ropes, rings, mats, parallel bars and vaulting bars.[4]

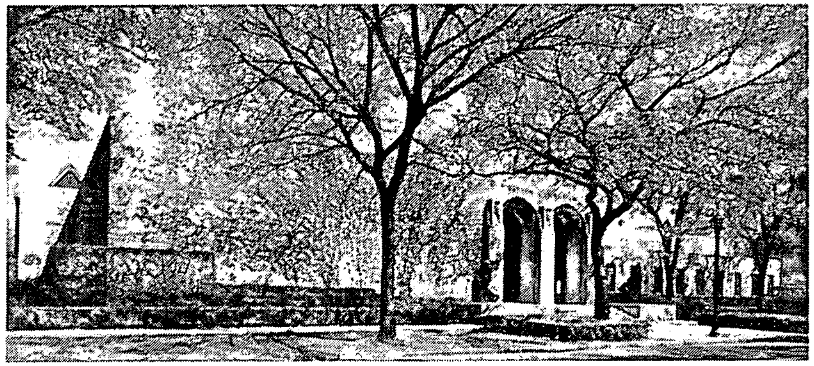
In "The History of Higher Education in America" (1906), C. F. Thwing comments that "in many colleges, in all parts, attempts were made to give to students through labor on the farm or at the bench, money, recreation and sport. The endeavor was honest and sincere. It was believed by many people that pushing a plane was quite as remunerative in fun and health as pushing a football."[5] However laudable these efforts may have seemed to their sponsors, they did not appeal to the students, who found greater satisfaction in the competitive aspects of intercollegiate athletics. 1850 to 1880 was the great age of amateurism, beginning with boat racing in the 1850's, baseball during the Civil War, track in the mid-1860's, and the first intercollegiate football game in 1869 between Rutgers and Princeton. Facility requirements were simple: a body of water or a large field marked out with chalklines.

In his study of American college athletics for the Carnegie Foundation (1930), Howard Savage marks 1880 as the turning point in intercollegiate sports. At that time professional coaching, specialization and administrative control were introduced, especially in baseball and football. This change in emphasis affected the design of facilities. Spectators began to outnumber not just the athletes, but also the total enrollments of the institutions represented by the teams. By 1913 five large stadia seating over 10,000 people had been constructed; in 1920 there were eleven; in 1923 nine more had been built; and by the end of the 1920's, the "Golden Age of Sports" had resulted in the construction of over a hundred stadia. An apogee was reached in 1927 when thirty million people paid $50 million to watch college football in permanent stadia that have a total seating capacity of over two million spectators.

Many educational leaders were unhappy about the over-emphasis on spectator sports, and perhaps also about the large mortgages which the colleges had to carry to liquidate a stadium that was used hardly more than a half dozen times a year. To offset this, intramural sports and physical education courses were introduced into the curriculum with the intention of attracting student participation rather than mere observation. Intramural programs were aided by the construction of gymnasiums and field houses which could serve intercollegiate athletics, physical education and intramural recreation.

At the largest institutions and even at small colleges where spectatorship was dominant, the best facilities were reserved for the varsity. Similar, but not equal, facilities were provided for the rest of the school. The stadium grass *had* to be green and the gymnasium floor well varnished for the "big game." Many of these varsity sports and recreation fields now stand in the heart of the campus. Maintenance of duplicate facilities is an expensive policy which may be challenged in

the years ahead. It is not likely, however, that intercollegiate athletics, intramural programs and scheduled physical education classes will be abandoned. Their position in the educational program is secure and is considered a necessary part of collegiate life—as evidenced by Harvard University's annual appropriation of $500,000 for athletic expenditures over athletic income. The construction and maintenance of structures having large seating capacities is not abating, as indicated by the number of field houses erected for basketball during the 1950's.



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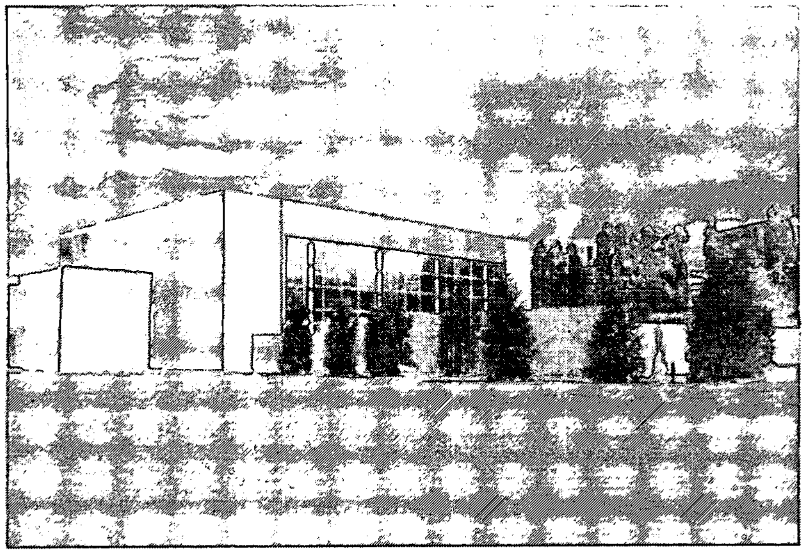

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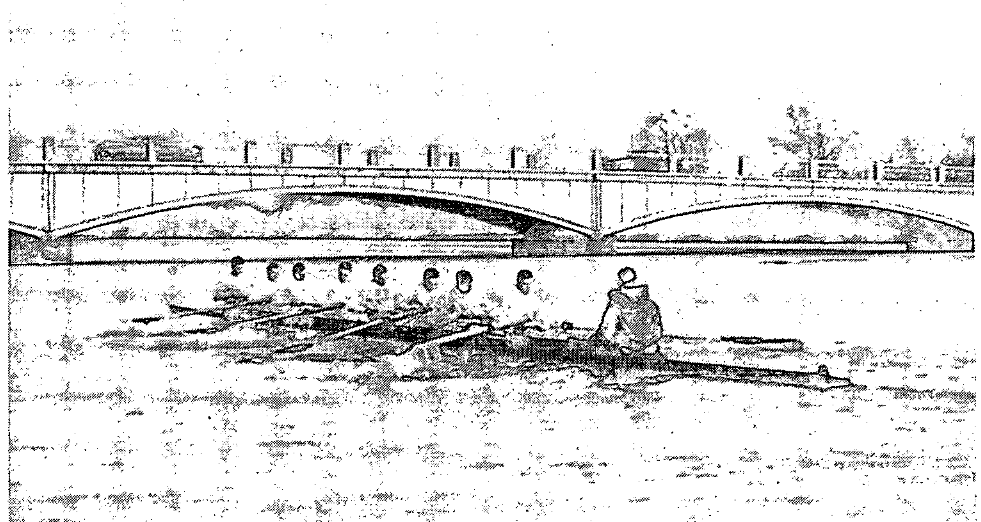
3
Patten Gymnasium, Northwestern University
NORTHWESTERN UNIVERSITY INFORMATION BUREAU

4
M.I.T. Swimming Pool (1938)
Architect: Anderson and Beckwith
M.I.T. PHOTO SERVICE

5
Not all water sports are carried on in a tank
The Princeton Crew on Lake Carnegie, an artificial lake created in the early 1900's.
PHOTO: PRINCETON UNIVERSITY NEWS BUREAU



5

157

ATTITUDES TOWARD DESIGN

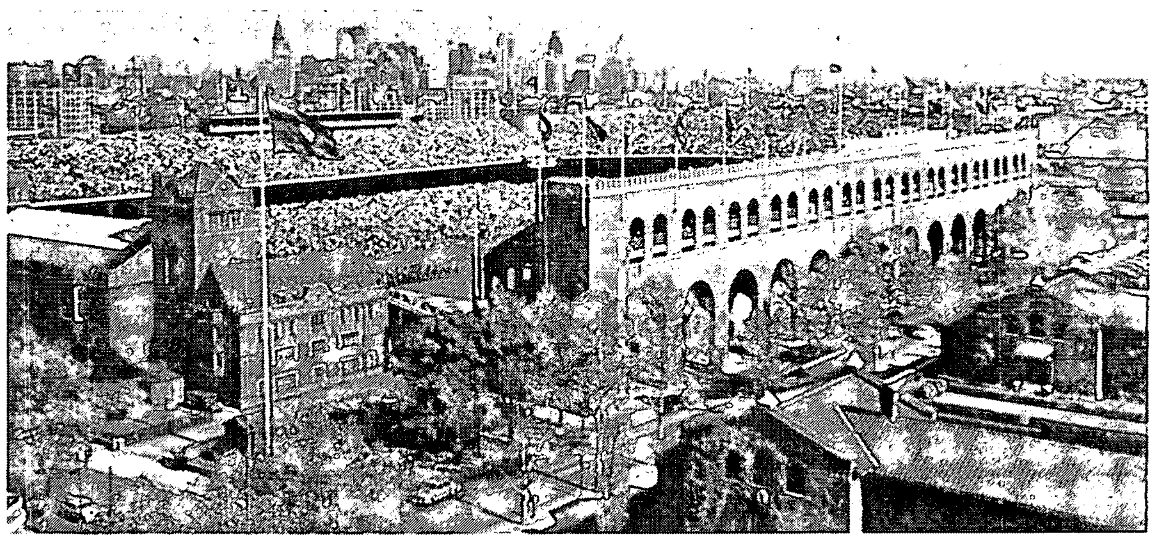
Except for Anderson's and Beckwith's swimming pool, the pre-World War II facilities for sports and recreation are marked with the exaggerations that afflicted so much of the architecture of the time. Though functional space requirements clearly belonged to the 20th century, architects insisted on decorating the buildings with plastic replicas from the past. Klauder and Day (1923) ingeniously engineered a site solution for enclosing Franklin Field at the University of Pennsylvania. Recognizing that "Gothic style does not lend itself to stadium design," which would have been required to "match" its environs,[6] the architects lost the chance for a significant historical structure by imposing a modified Roman idiom on the exterior of a simple structure.

Architects were forced, however, to respect the space and equipment requirements of the indoor sports, and the interiors of the major buildings in the 1920's were similar in many ways. On the exterior, however, each architect impressed his own version of the prevailing taste. In Charlottesville, Fiske Kimball (1924) struggled to disguise the large interiors of the University of Virginia gymnasium by using "the Roman bath motif—with five arches and gabled bays flanked by Corinthian columns, being a fragment of entablature."[7] At Brown University the designers surrendered to style with an awkward building rationalized as "suggesting a type familiar in New England and carried out on a large scale necessary to fit the massive proportions." For the Payne Whitney gymnasium at Yale, the architect erected a mammoth Gothic monument whose exterior appearance resembled a cathedral rather than a collection of rooms devoted to squash, swimming and other sports.

The Rutgers gymnasium perhaps best epitomizes the state of campus architecture in the 1930's. Philip Sawyer, the architect for the building, wrote: "To retain Colonial characteristics in so large a building, it has been planned to appear as four small units surrounding a quadrangle, but is really the main gymnasium floor."[8] The second Hemenway gymnasium at Harvard (Coolidge, Shepley, Bulfinch and Abbott, 1940) is another example of stage craft. Strong and simple in its massing and materials, the building is marred by reportedly "vigorous requirements" imposed on the architects: "a cornice height of forty feet to conform with neighboring buildings," a dash of Georgian woodwork for the sake of tradition, and "a cupola to bear the historic weathervane."[9]

One would expect that in the post-war period the demand for sports and recreational facilities would offer logical opportunities for significant commissions in contemporary architecture. The need for quantities of inexpensive space, with extra large span requirements and mechanical equipment, lends itself well to contemporary structural concepts. With a few exceptions these potentials have not yet materialized. Rather, there has been a spread of industrial-like sheds and buildings; or facilities cramped by cost, or an unfortunate allegiance to cheap camouflage in the forms of historic idioms. Successful solutions have tended to be structures for facilities connected with regional sports which local climate permits or encourages, such as ice hockey rings in the north, tennis and swimming facilities in the south.

6
Franklin Field (1923)
PHOTO: UNIVERSITY OF PENNSYLVANIA
7
University of Virginia Gymnasium (1924)
PHOTO: UNIVERSITY OF VIRGINIA NEWS SERVICE
8
Payne Whitney Gymnasium
PHOTO: YALE UNIVERSITY NEWS SERVICE
9
Rutgers University Gymnasium (1932)
PHOTO: RUTGERS UNIVERSITY NEWS OFFICE
10
Southern Methodist University Coliseum (1960)
PHOTO: JOHN MESSINA



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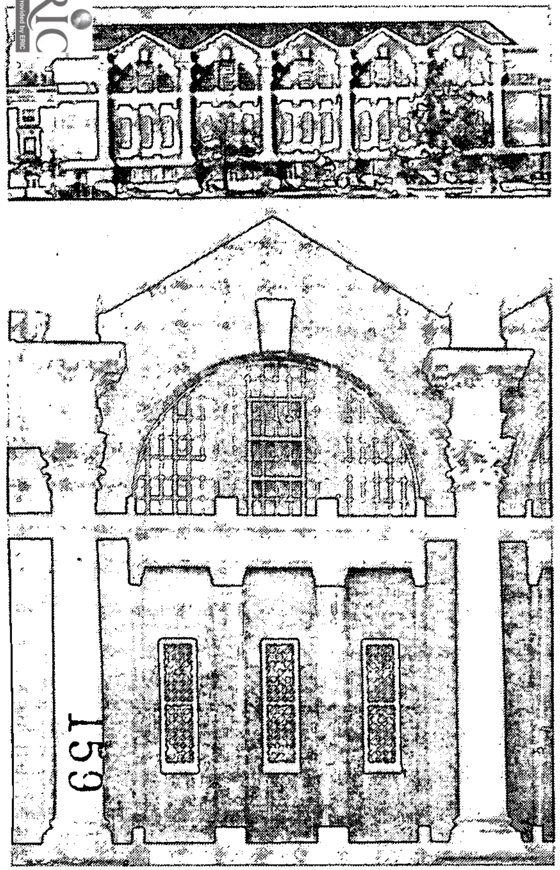

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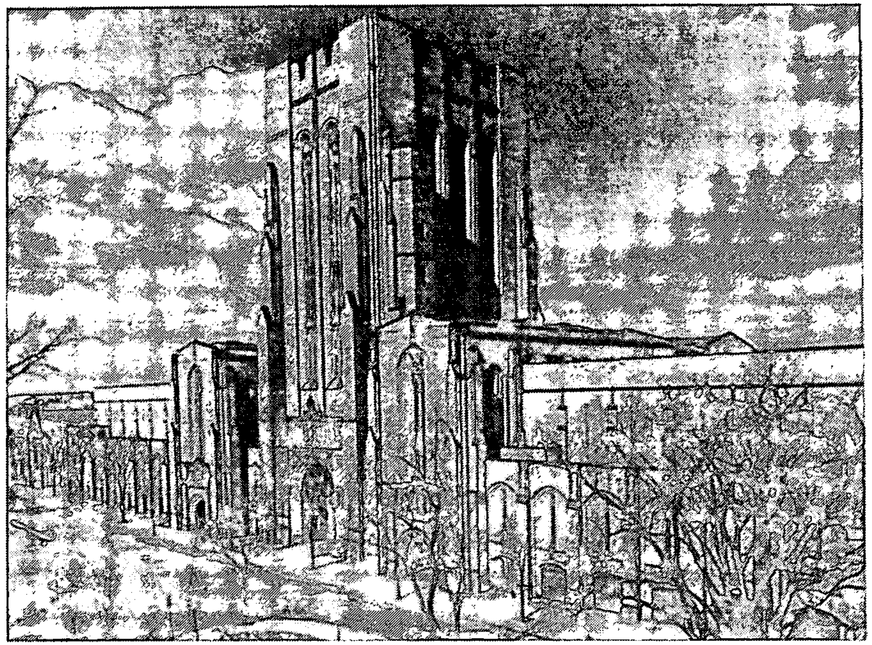

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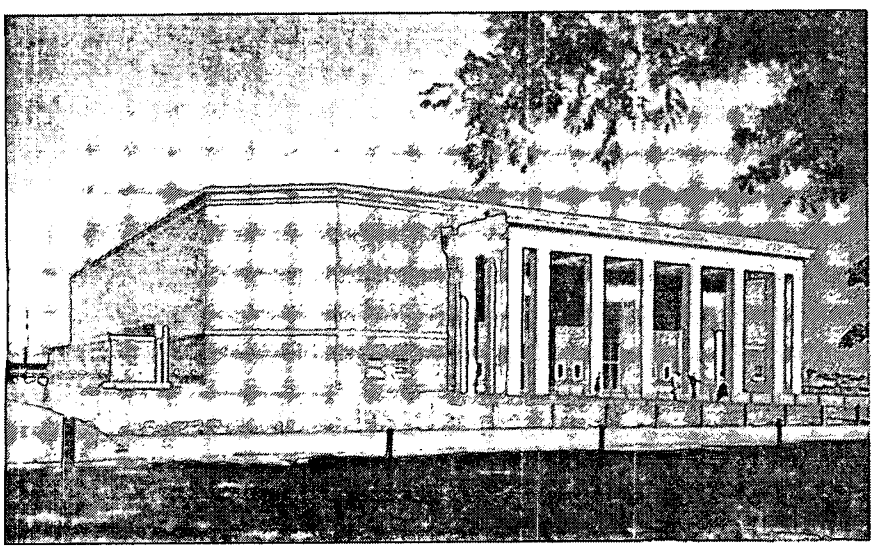

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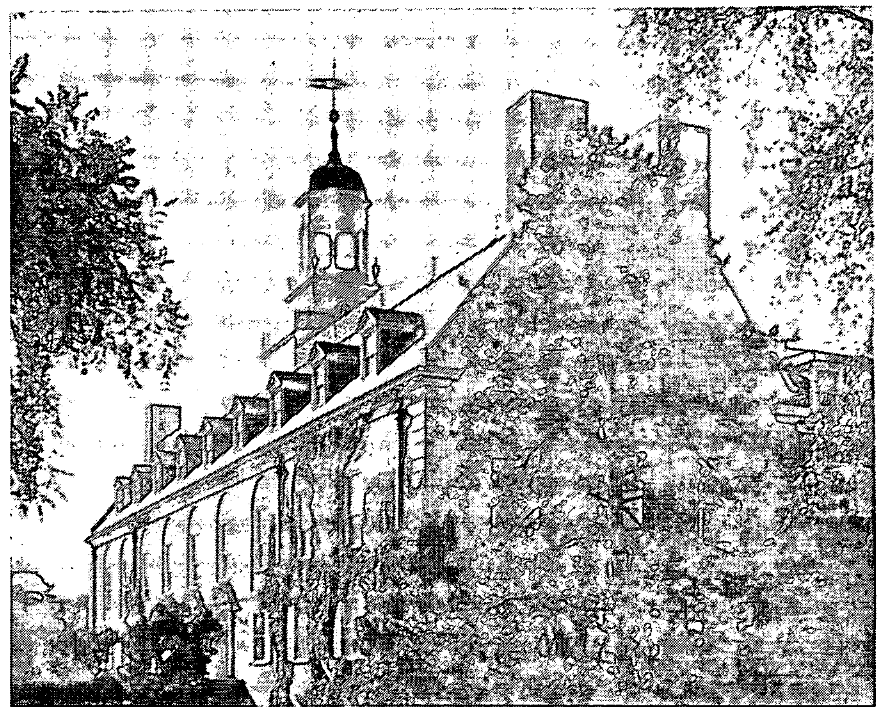

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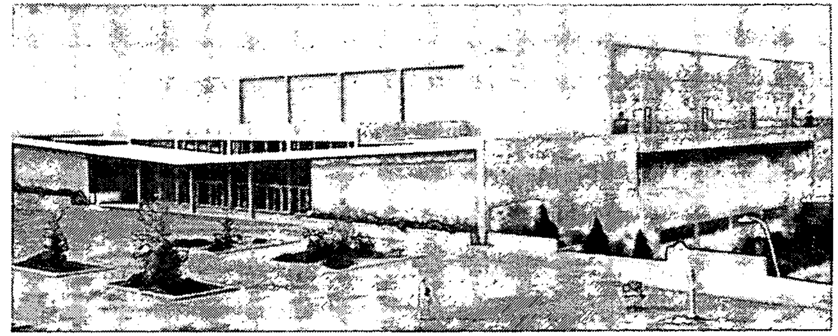

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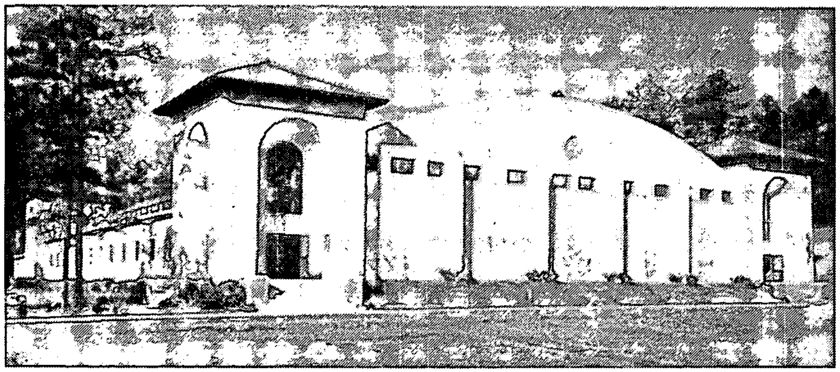

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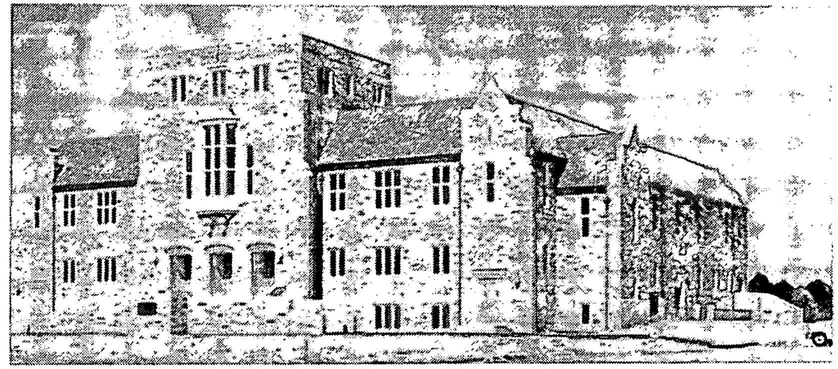

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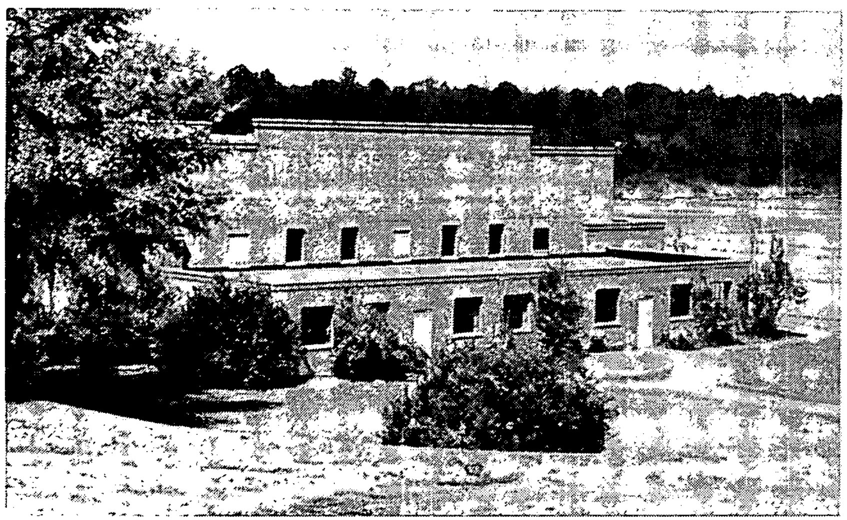
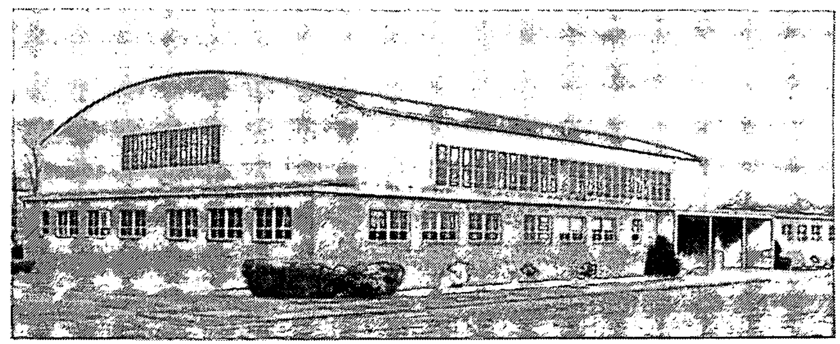
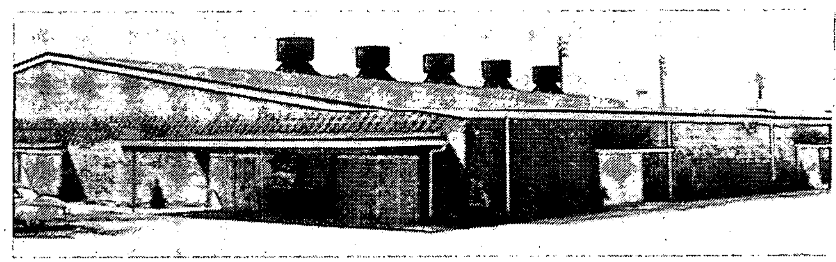


11B





12D

11A, B

In the 1930's Emory University and Alabama State College both converted airplane-hangars into useful gymnasiums, shown above as they appeared in 1962.

12A, B, C, D

Four mid-century gymnasiums

12A

Bakersfield College (1955)

12B

Southwestern at Memphis (1953)

12C

Westminster College (1951)

12D

Murray State College (1959)

13

University of Utah playfields

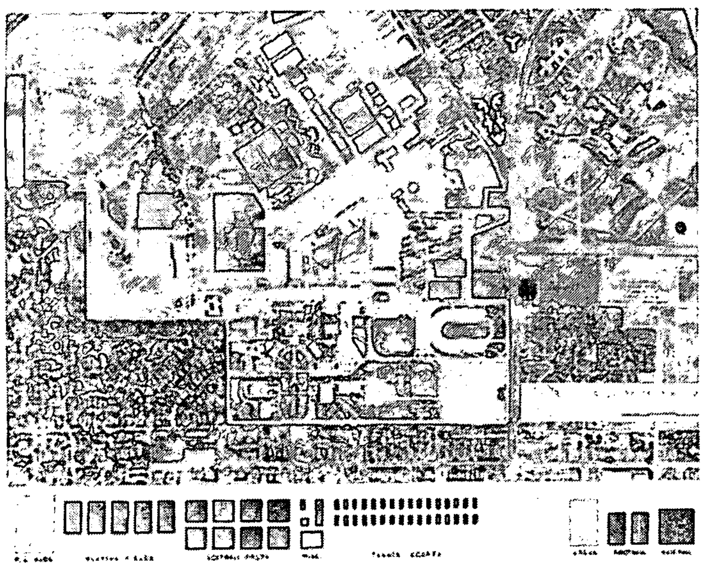
Use of planning modules in laying-out preliminary sites for playfields.

COURTESY: UNIVERSITY OF UTAH CONSTRUCTION AND PLANNING OFFICE

14

Southwestern State College, Oklahoma (1958)

A typical plan layout of indoor facilities.



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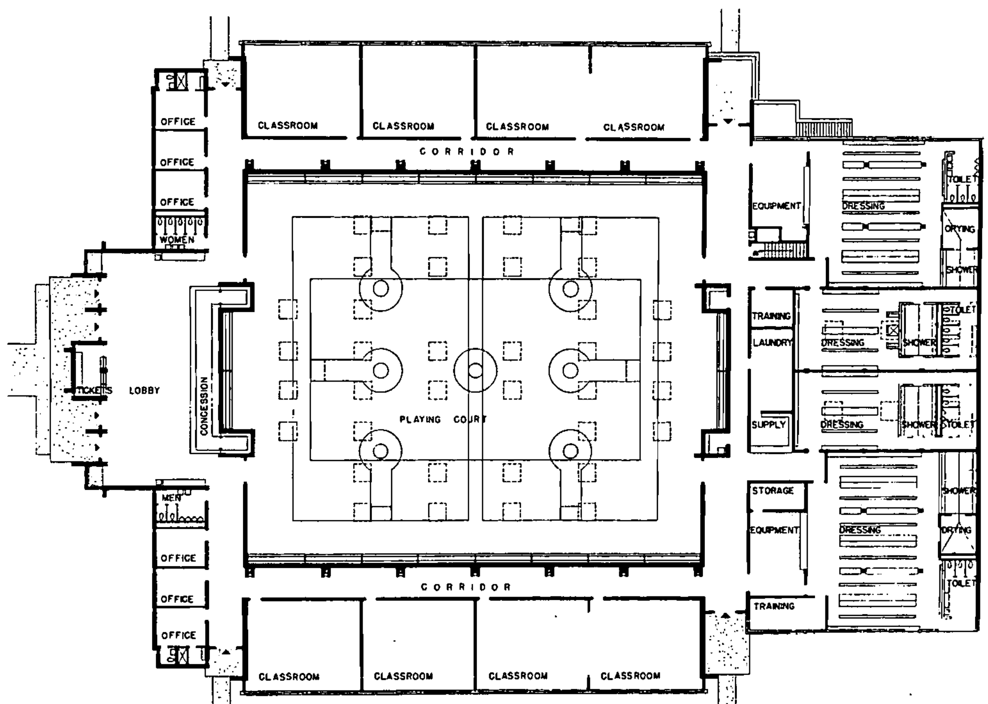

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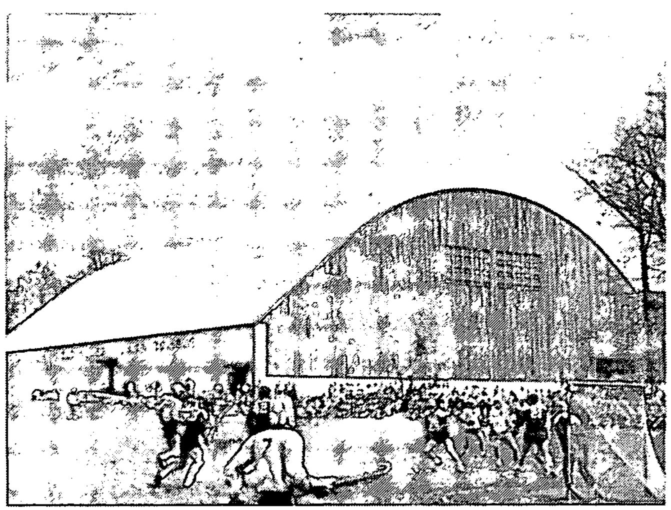


15
Union College Field House (1955)
One of the last buildings designed by the firm of McKim, Mead and White.

PROGRAMMING

Sports and recreational facilities programming is the no man's land of campus planning. Successful individual buildings for sports and recreation can be cited, but the overall view as to what constitutes an adequate set of facilities for comprehensive and development plans is missing in current professional literature. The 1958 standards for the longrange planning of new campuses for the University of California have become the widely accepted guide.[10] While on one hand this is a tribute to the pioneer work of the University committee, on the other hand it points up a critical gap in basic research for campus planning, since the climate of California allows an activity pattern quite different from that of New England or the Midwest. Another important variable in programming which makes it difficult to establish an overall set of minimum requirements is the distinction that must be made between campuses that are coeducational, and those which are simply for men or women. Finally, the matter of relative land supply has to be considered. Playfields require greater acreage in proportion to the number of people who use them than other campus uses, except for parking. A five-acre baseball diamond poses serious problems for urban campuses where land is scarce, but five acres may be of little consequence at institutions with low densities.

Though qualifications and exceptions outnumber any rules-of-thumb for programming facilities, the problem of programming can be reduced to manageable proportions if facilities are first examined as individual program requirements and then recombined into operational entities. Detailed discussions and reviews with members of the schools' physical education departments, coaches and intramural leaders are necessary throughout the planning and programming.

The current trends in sports and recreation which may affect the future planning and design of facilities are:

1. *Carry-over sports.* These are recreation skills that can be acquired early and continued through old age, such as golf, tennis and bowling; such activities require larger spaces per user than the traditional gymnastics and indoor court sports, such as basketball.
2. *Diversity in intercollegiate sports.* The traditional sports—football, basketball, track and baseball—have been extended to include soccer, rugby, lacrosse, swimming, tennis, skiing, rifle and even parachute jumping. Likewise, the intramural programs now include some of these activities. As a result, a larger number of formal playfields are needed.
3. *Multiple facilities.* Though there is no enrollment size at which duplicate facilities become a mandatory project, similar facilities in gymnasiums and swimming pools for men and women have become the accepted practice on co-educational campuses.
4. *Special recreation buildings.* On campuses where total population is sufficient to pay for construction and operation costs, especially at the larger universities located outside metropolitan areas, informal active recreation is being taken out of the student union building and placed in a special structure.

To start programming and planning, examine sports and recreation as matters of policy. List categories of desired facilities. These may include:

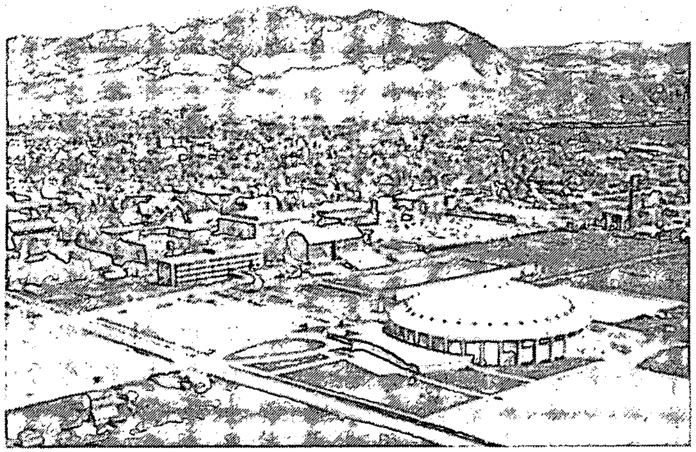
1. The teaching of physical education instructors (professional courses)
2. Physical education activity as part of the academic program for all students (scheduled instruction)
3. Organized intramural sports
4. Intercollegiate sports
5. Informal recreation

List the type of physical facility for each activity to be supported in each category. Planning indices shown on page 157 are typical.

The list can be a tentative account, subject to further study and policy decision. Translate the preliminary program into planning modules. Divide the lists into field space needs and building space needs.

Examine the list in its relationship to programming, site selection and design:

1. Establish priorities in the program: essential facilities versus desired ones.
2. Consider the cost of construction for



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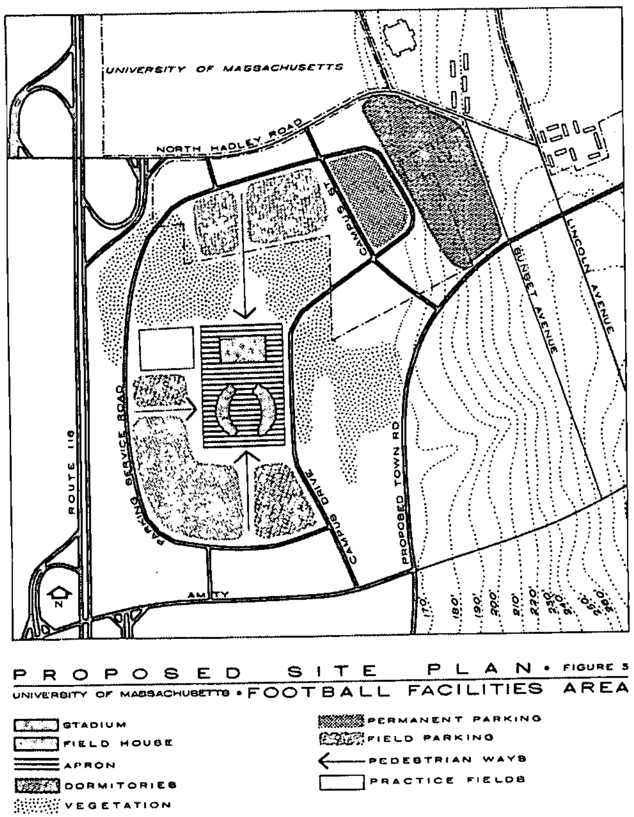


17

16

Health and Physical Education Center (1960)
Montana State College
Bozeman, Montana
Architect: Oswald Berg, Jr., and Associates

The facility is designed for student physical education, varsity and spectator sports, and general public activities. The acoustical and engineering problems were so well resolved that the building has been operating all year round as a community auditorium for concerts and lectures. The main arena has a diameter of over 300 feet, and is approximately 90 feet high at the center of the laminated wood shell dome. Seating capacity: 15,000 people.

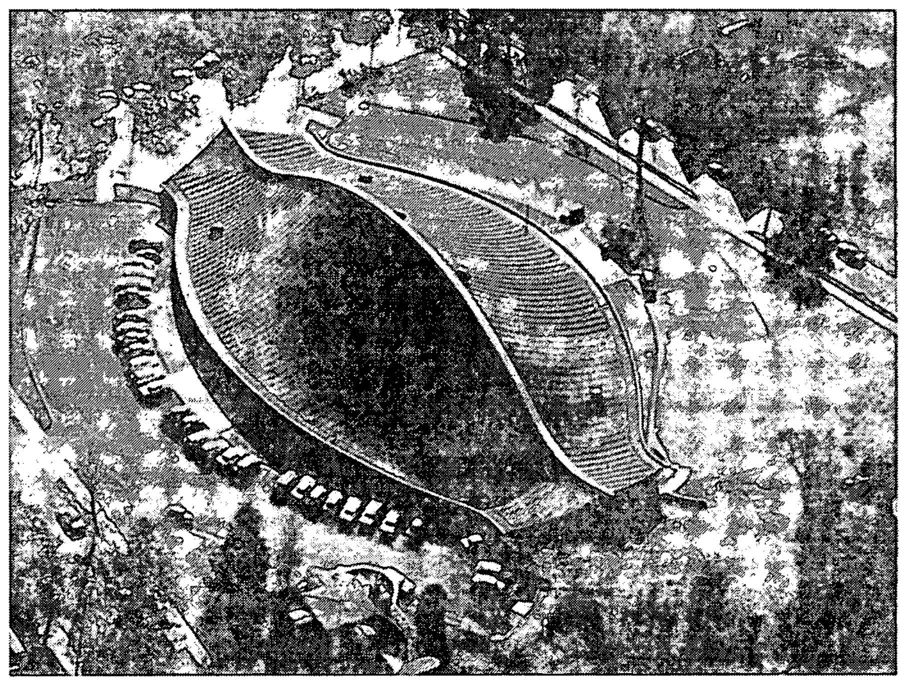
17

University of Massachusetts Football Areas (1962)
The use of planning modules in preparing preliminary site development plans for football areas at the University of Massachusetts.

From: Report on Proposed Football Facilities
Prepared by: Sasaki, Walker & Associates, Inc.

18

David S. Ingalls Rink (1959)
Yale University, New Haven, Connecticut
Eero Saarinen & Associates
PHOTO: YALE UNIVERSITY NEWS SERVICE



18

: 15: Planning Index and Planning Standards For Outdoor Sports and Recreation

TYPE	MINIMUM SIZE PLAYING AREA	ACREAGE EQUIVALENT
Archery	100 yds. x 150 yds.	.30 acres
Badminton	25 ft. x 60 ft./court	
Baseball	350 ft. x 350 ft./field	2.8 acres
Basketball	90 ft. x 50 ft./2 team court	
Bowling Green	120 square feet	
Croquet	30 ft. x 60 ft.	
Cross Country	5 mile course	
Field Hockey	210 ft. x 330 ft.	1.6 acres
Football	160 ft. x 360 ft.	3. acres
Golf	18 hole standard course	160. acres$_a$
Golf	Pitch/Putt course	6. to 10. acres$_b$
Golf–Putting Green	30 ft. diameter	
Handball	30 ft. x 40 ft./court	
Hockey Rink	65 ft. x 165 ft.	.5 acres
Lacrosse	225 ft. x 360 ft.	1.8 acres
Polo	600 ft. x 500 ft.	15. acres$_a$
Rifle and Pistol Range	100 yds. x 25 yds.	.5 acres$_b$
Rugby	330 ft. x 300 ft.	2.5 acres
Track and Field		4. acres$_a$
Soccer	225 ft. x 360 ft.	1.8 acres$_a$
Softball	275 ft. x 275 ft.	1.75 acres
Tennis	60 ft. x 110 ft./court	
Volleyball	60 ft. x 30 ft./court	

a–includes small allowance for spectator accommodations
b–special safety requirements needed in siting facilities

each type of facility. Those used by groups of people such as softball, badminton and basketball are usually cheaper than facilities for individual sports such as golf, squash and tennis.

3. Consider annual operation, supervision and maintenance costs.

4. Examine safety requirements. Full attention to site design standards will help ensure proper operation.

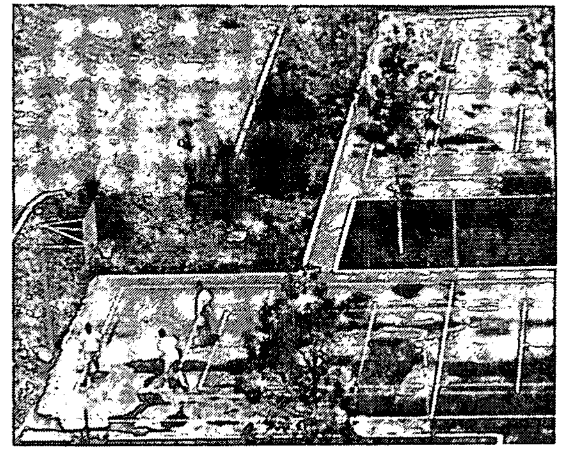
5. Give preliminary consideration to location. Heavy use areas, with noise, bustle or simple structures may not be appropriate "front-door" activities. Gymnasiums serving as locker rooms for physical education should be as close as possible to the outdoor field spaces used for instructional purposes. Informal playfields should be sited within reasonable distance of housing areas. Review and list special location requirements as policy matters and as guides for planners.

6. Combine individual program requirements on the basis of seasonal use. Touch football and soccer fields used in the fall can double for softball and baseball in the spring. Scheduling can help maximize the use of facilities. The basketball gymnasium, for example, can be used for instructional purpose during the day, for informal recreation when not in use by scheduled classes, and for intercollegiate athletics. Combined field functions may be visualized by diagramming requirements according to seasonal activity, and then employing these drawings as overlays on the site plan.

7. Check parking and circulation requirements for facilities that are likely to attract large numbers of spectators.

8. Check staging of development with reference to other campus improvements. Make allowances for fields displaced for other construction during the planning period. Heavy investments in preparing drainage for outdoor sports may not be warranted when the fields are likely to become sites for buildings early in the plan. The possibilities of using fill from construction to create usable outdoor spaces should be considered. A checkerboard arrangement of informal recreational areas may serve equally as a facility and as an open-space buffer between residential buildings. Evaluate multiple use structures, such as tennis courts placed on garage roofs. Preplanning for additional loads on the garage structure may be an economical move, if land costs approximate $5.00 a square foot, and if tennis courts now on the ground may have to be replaced later by a building.

9. Check site orientation conditions when locating fields and in specifying glass for the structures. Strong suns and prevailing winds will affect the usefulness of facilities unless proper precautions are taken.



19
U.C.L.A. Play Courts
Informal recreation areas can be conveniently established near residential buildings, as was this basketball court and volleyball court.

IMATING PLANNING MODULES

Field Spaces

Establish planning modules from planning standards shown in Table 15. Modules can be represented on the plan by dimensions and general layout, or simply shown as acreage enclosed by a line and labeled by use. Because baseball diamonds and tennis courts are easily drawn, the general layout is a better graphic device, as it helps illustrate the scale of the fields on the plans.

Stadiums

To prepare planning modules and reserve acreage for a stadium, the following information will be sufficient as a preliminary guide. The size of the stadium will depend on:

a. The playing area enclosed
b. Number of seats
c. Type of dressing room accommodations for players, umpires, and others
d. Number of public toilet facilities
e. Number and type of vendors' stands
f. Ticket booths and administrative offices

The total acreage required will be a factor of stadium size, and the amount of land needed for adjacent parking areas and roads. Six acres of land will be sufficient to site a football field, surrounded by a quarter-mile running track, and some bleachers. The California site studies[11] suggest that 150 acres be reserved if a large seating capacity stadium is needed. This figure includes parking areas as well as the facility itself.

Swimming Pools

For an enclosed pool with related dressing room facilities:

a. estimate the pool at twenty feet per user. Minimum recommended pool size is sixty by thirty-five feet; however, standard size for a pool used in competitive sports is forty-two feet by seventy-five.

b. as a rule of thumb, enclosed space equivalent to the size of the pool itself will be sufficient for minimum dressing accommodations.

c. for an outdoor pool adjacent to a gymnasium or other facility containing dressing rooms and related space, reserve .10 of an acre.

Gymnasiums

Gymnasiums come in all sizes and for many purposes, sometimes doubling as an auditorium or chapel. For a reasonable planning module estimate, ten square feet per student enrolled in scheduled instruction in physical education.

The average size of sixty-eight physical education buildings constructed in 1960 was 45,000 square feet net. On the basis of these buildings, another reasonable planning module (not related to enrollment) would be a one floor facility, approximately two hundred by two hundred twenty-five feet.

Planning modules for sports buildings should be specially designed to meet local conditions and needs. The facility standards suggested above will help in reserving sites for future construction and illustrating ground coverage, but beyond that, individually designed modules may be necessary, even in development plans. This is because of the great variations in the activities that will be carried on in each building.

FOOTNOTES

1. Coulter, E. M.; "College Life In The Old South"; Athens, Georgia, University of Georgia Press; 1951; page 100.
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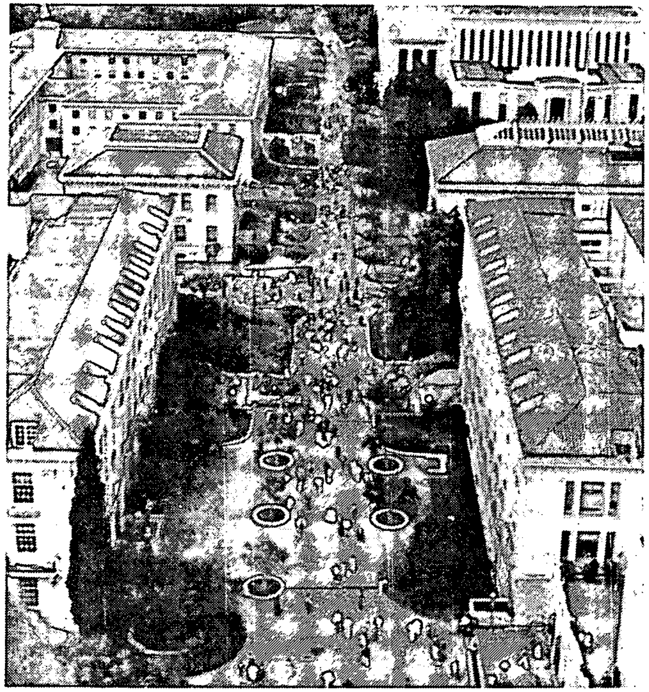
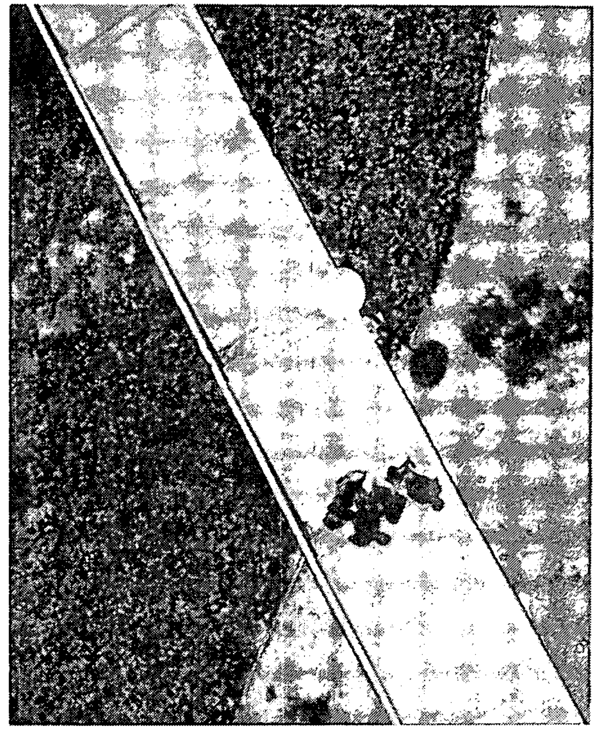
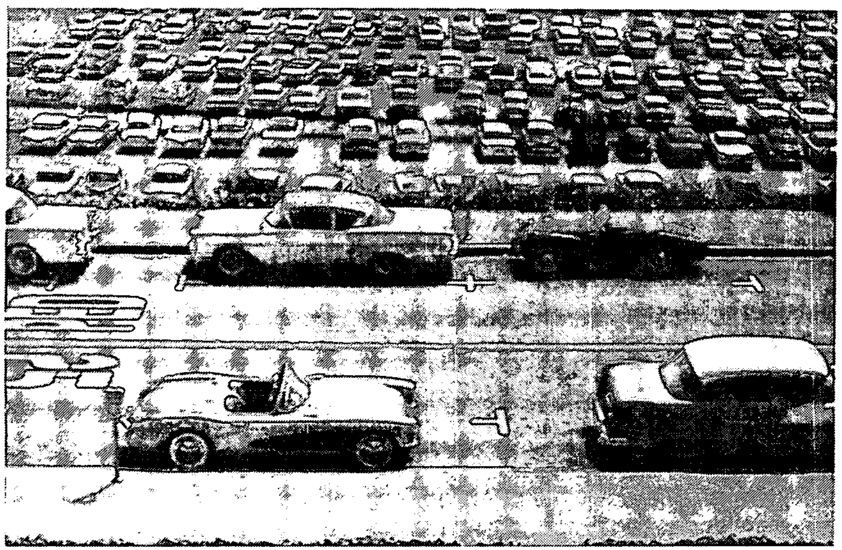


1A, B
Major pedestrian path and minor pedestrian path





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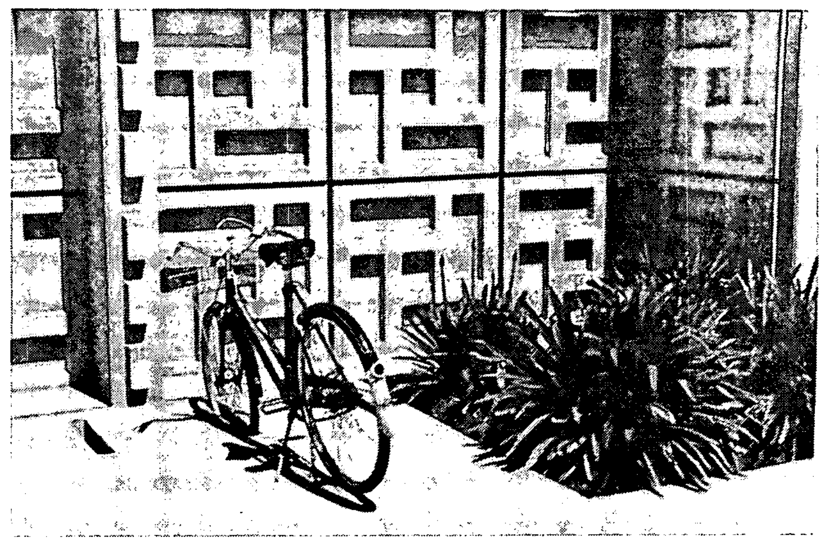


3

2
The campus as a parking lot
3
The bike at rest
Stanford Medical School (1959)
Architect: Edward D. Stone & Associates

9. Circulation and Parking

THE RELATIONSHIP OF AUTOMOTIVE CIRCULATION AND PARKING TO THE CAMPUS PLAN

In evaluating circulation and parking on campus, one must first examine the overall transportation and circulation system off campus. With the exception of a dozen or so urban campuses located near the heart of the core cities, most campuses lie along those lines of regional communication which are presently weakest in supporting mass transportation. Unless there are steady improvements made in mass transit, or a technological innovation replacing the private car, or a change in personal tastes among choices of available transportation, the automobile will continue to be the prime carrier to and from campus. Within this context, parking is at one end of a list of physical planning considerations and regional highways at the other.

Properly handled, the automobile is not an impediment to creating a well designed campus plan. Nor is its use inconsonant with the goals of higher education.

The automobile made it possible to consolidate rural and suburban elementary and high schools in the early 1920's. This resulted in enlarged curriculums, better teaching, more efficient administration, and at lower costs.[1] A similar effect may be observed during the next decade among the new highway-oriented colleges and universities. "Drive-in" campuses are being planned in southern Illinois, California, and Texas predicated on the belief that a high percentage of the student body will commute by private vehicle.

Where one parking space per four students is an accepted programming norm for development plans, these "rubber-tire schools" are planning almost a one-to-one parking ratio. Politics and economy, rather than convenience to the automobile owner lie behind these measures; politics because individual states are committed to providing higher education for all, economy because a commuting college or university education is relatively inexpensive for the student. The difference between the price of education on a "drive-in" campus compared to that of a residential campus can amount to $1,000 a year, which is the average cost for campus room and board. Commuting expenses should be a third of that, even lower if mass transit is used.

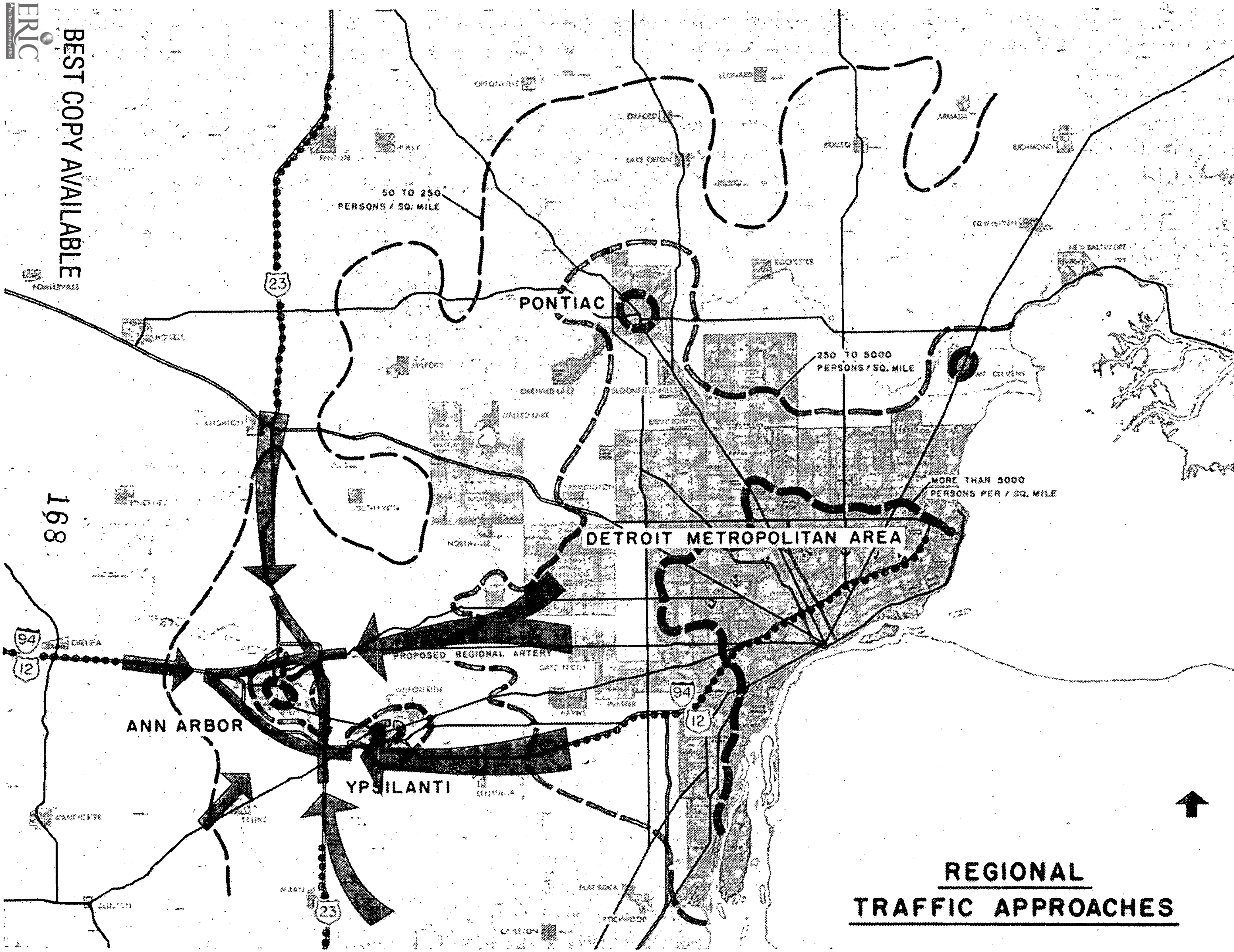
Commuting colleges have a higher student-teacher ratio than residential colleges. Commuting students use campus facilities less intensively than residential students. The operating charges to the individual and for the institution are accordingly that much less.

Earlier discussions of housing issues emphasized the advantages of a residential education. To balance accounts, the potential strengths of commuting campuses deserve mention. By coordinating new campus locations with highway planning, unusual educational diversity may be engendered. If several schools are equally accessible, the time-distance and locational factors can be exploited. Rather than many schools striving to gain self-sufficiency in all aspects, co-operative educational programs could be established; and each school could contribute from its own best resources. Typical joint ventures might include: sharing of expensive research tools, such as a computing center; cross-registrations in courses having low enrollments; library exchange privileges.

To some extent this opportunity is already being exploited along the Atlantic seaboard in what Joshua Fishman sees as a contemporary version of the medieval university —itinerant scholars and wandering students, all traveling a scholastic circuit from place to place. Cedar Crest, Lafayette, Moravian, Muhlenburg, and Lehigh in eastern Pennsylvania; Amherst, University of Massachusetts, Williams, Smith and Mt. Holyoke in central Massachusetts have inter-institutional exchange programs in their respective regions. Such cooperative efforts by-pass the problem of great ambitions and little resources, which have been likened to "attempts by the Malay Federation to produce typewriters and TV sets while the United States struggles to produce synthetic rubber."[2]

Regional highways have strong, direct and immediate impact on campus planning. For example, if highway improvements in Rhode Island are accomplished as scheduled, the major connections between the state university and the regional road network will lie to the north of the University of Rhode Island campus, not to the south, as presently located. This means that within ten years the logical front door of the campus will spin 180 degrees. The University's development plan allows for this change by phasing construction so that the opening of the new highway and the University's north campus development will occur conjunctively.[3]

In Boulder, Colorado, the terminus of the Denver Turnpike ends near the University of Colorado campus at a critical intersection for city and campus traffic movements. The university's best use of land is temporarily aborted, pending a decision on how to relocate a crosstown road that carries traffic to



REGIONAL TRAFFIC APPROACHES

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d from the turnpike interchange; a road which presently divides the campus. Had city and campus planning been sufficently advanced at the time the turnpike location decisions were made, the situation could have been avoided.

Community and campus traffic have a warp and woof relationship; sometime the two connect together. Occasionally campus streets serve for local use, and vice versa. As a planning principle, it is desirable whenever possible to separate community traffic from campus traffic in order to increase both capacity and rate of flow in each. This may be done by eliminating direct routes through the campus and by improving community streets on its periphery. Internal campus traffic may then be handled as much as possible on its own streets. As a theoretical goal in planning, there should be a hierarchical relationship between various segments of the circulation system on and off campus. Based on scales of motion appropriate to the vehicle involved, this sequence for automotive traffic is a smooth flowing deceleration pattern:

1. Regional highway to
2. Major community road to
3. Campus gateway to
4. Major campus road to
5. Minor campus road to
6. Terminal point

Co-operative enterprise by town and gown in analyzing and proposing circulation solutions is called for, especially curb parking which is a constant source of friction for urban campuses. This problem will vary in magnitude according to the campus' location with reference to high demand parking areas in its environs; how much land the institution owns or can acquire; and how the institution's population is dispersed with reference to mass transportation systems and patterns of commuting. The following conditions seem universal: parking overflows designated spaces on campus and local streets when supply and demand have not been balanced or when parking regulations have not been enforced. The human factor is also at work, even when there is sufficient parking on campus. By proclivity, habit, or to avoid paying campus parking fees, employees will leave their cars on surrounding streets and walk short distances to work. Students will do the same, sometimes just to avoid campus restrictions on the use of automobiles.

Having sketched out the range and interrelationships of circulation and parking problems, off-campus suggestions are in order as to programming and planning techniques. To some extent traffic control is a highly technical matter, especially with regard to signal systems, electronic analysis of flow patterns, and estimates of road capacities. Whenever problems point towards technical solutions, economy of effort may be achieved by bringing in a traffic specialist early in the planning. For general planning purposes the survey and analysis will indicate the hierarchical relationships between parts of the circulation systems, disclosing the extent of remedial programs required. In that ideal world toward which all planning gently moves, regional agencies outside the campus should be made aware of the institution's long-range circulation requirements. Local government must work hand-in-glove with campus planners, smoothing those points of transition where campus traffic merges into that of community.

4
Summary of regional influences on traffic movements relating to the development of the University of Michigan Medical Center.

Plan prepared by: Johnson, Johnson, & Roy (1961)

PROGRAMMING CAMPUS CIRCULATION

As to the circulation goals within the campus, each of the nation's 2,000 college and university sites and situations is different; but the principles of convenience, safety and aesthetics are common to all. Convenience suggests: speed when desired; propinquity when at rest; reasonable protection from the acoustical and visual nuisances traffic can have. Safety is a commitment to friction-free traffic flows, including adequate road capacities, proper acceleration and deceleration lanes, good turning radii, accident-proof lighting and signalization, a logical sequence in linking all traffic channels, et al. Aesthetics implies a coupling of functional requirements with design opportunities. Circulation can be designed as a pleasant experience. Whether walking or riding special effects are in order at the beginning and at the end of the journey. The terminal points of any part of the network should be well marked. Getting there should be half the fun. Site, landscape, buildings, spaces, channels of movement can be organized to please the senses, not to stun them.

The best current technique for estimating campus circulation requirements is a combined analysis of future land-use patterns and campus population composition. The population forecasts will yield clues as to probable total automotive demand. A straight-line projection of existing traffic volumes may be used, paralleling population increase, but allowances should be made for such things as: (1) improvements of mass transportation; (2) changes in percentage of students housed on campus or in the immediate environs; (3) changes in the percentage of graduate and married students in the student body; (4) improvements in external road conditions which may encourage a dispersal of off-campus population; (6) significant additions to parking on campus or in the immediate environs; (7) alterations in the operational pattern of the school, as for example, the addition of late afternoon and evening programs; (8) an increase in contract research or extra-educational activities.

Determination of how traffic is to be distributed, what channels are to be used, and where they are to be located will depend on the arrangement of land uses and the selection of sites for buildings and functional outdoor spaces. As a guide to preliminary planning, the earliest sets of instructions to the designers can establish general policy for development, such as these planning goals:

a. Creation of traffic-free pedestrian precincts.

b. Segregation of traffic types by separating the channels of movement for pedestrian, bicycle, and automotive flow.

c. Servicing to all buildings, preferably from the automotive, not the pedestrian, side of the building.

d. Grade separations between major roads and major pedestrian paths.

e. Logical connections in traffic flow; for example, a conflict-free flow from major to minor roads, to parking lots, and from major to minor paths.

f. Favorable circulation design, including grades, sight lines, and appropriate landscape embellishment.

g. Optimum parking facilities.

Major Elements

Three types of flow comprise the campus circulation system: automotive, bicycle and pedestrian.

Internal circulation begins at the campus gateways, which link the institution to its environs. Because they are the points of entry they require special design treatment. (There are also symbolic gateways, not carrying traffic, but which are points of disclosure along the boundaries of the campus through which special buildings, landmarks and vistas may be seen.)

Campus roads are the channels which carry traffic to and from the campus gateways, connecting points of origin and destination inside the campus. Campus roads serve also as convenient easements for utilities, fire breaks, and as open spaces between buildings.

The bicycle is again in fashion on campus—partly as a fad, but mostly because people have found no other reasonable alternative to walking. In volume, bicycles can be as hazardous to pedestrians as automobiles are to bicyclists; and they present a storage problem. Bicycle riders expect to be able to put their vehicles at the front door. As a planning principle, biking should be encouraged since it may reduce the amount of automobile traffic and parking requirements. Scooters and motorcycles belong in the same category as *automobiles*, not *bicycles* and should be treated accordingly. Bicycle paths, when not designed as separate channels, are located as special lanes in minor roads and major pedestrian paths.

Well-designed circulation systems are essential to the efficient use of the physical plant. Pedestrian traffic in particular has special import. Eight times a day the faculty and student body on a typical campus move from one place to another. Much of this movement must take place within ten minutes, which is the average time span between classes. There are, of course, other kinds of circulation which also have to be considered. As a theoretical goal, campus planning and programming must encourage a balanced system of transportation and communication within the bounds of economy, safety, convenience and aesthetics.

Generally, the following pedestrian circulation system will be needed on most campuses:

1. Transition areas from buildings to the path system. These may range from formal plazas to simple enlargements of the paths in front of the buildings, thus allowing ample movement during the critical ten minute period between classes when students are shuttling from one building to another.

2. Major pedestrian paths. These are the most direct lines between origins and destinations for the heaviest pedestrian traffic. Major paths are often designed to allow access for emergency vehicles such as fire trucks.

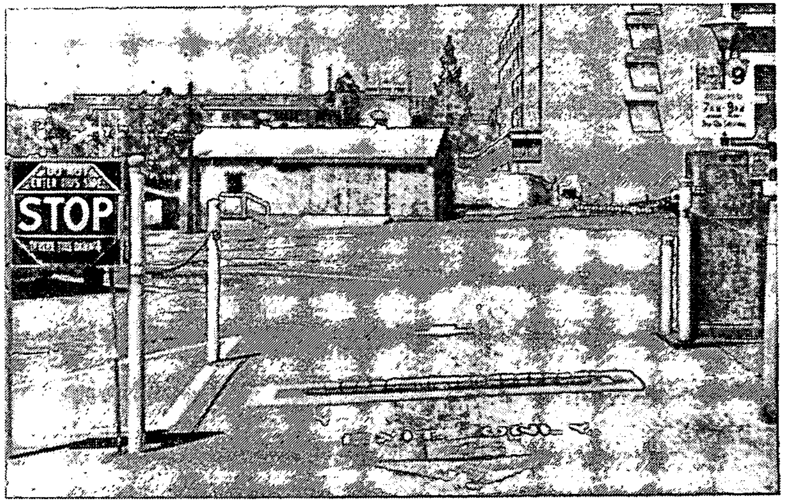
3. Intersections and exchange areas. These consist of crosswalks, pedestrian bridges and other site elements where traffic flows cross one another.

4. Minor paths; which are the other designated walks and areas giving pedestrians access to buildings and outdoor spaces.

Ordinarily, the formal axes of the campus plan are designated as major pedestrian paths. John O. Simonds, in his book *Landscape Architecture*, states that only these paths have to be planned in advance. Minor walks and meandering paths may be "laid down later along the unconscious and natural lines of movement worn thin in the turf."[4] On many campuses, however, it will be advantageous to establish both major and minor paths in the planning stage in order to control pedestrian movement and to arrange other site elements such as lights, benches, and planting. Major utilities may be located in underground trenches over which walks are constructed, so walks and utilities must be co-ordinated.

In addition paths can be designed in advance for their aesthetic effect; for example, as outdoor ambulatories for ceremonial purposes such as commencement. In these instances paths may reflect medieval urban design concepts. Spectator and participant in the movement are one. The analogy to medieval forms seems apt in that precinctual development of campuses has antecedents in the university super blocks, dating back to the original layout of the Colleges at Oxford and Cambridge.

Path systems can do more than mechanically follow natural circulation patterns, for they are among the principal elements giving shape to the open space of the campus and visual direction to the searching eye. In campus design the pedestrian can be carried forward through an interesting series of spatial forms. The existing and emerging view can be artfully arranged—first, by restriction and then by release, adding aesthetic pleasure to a necessary trip.



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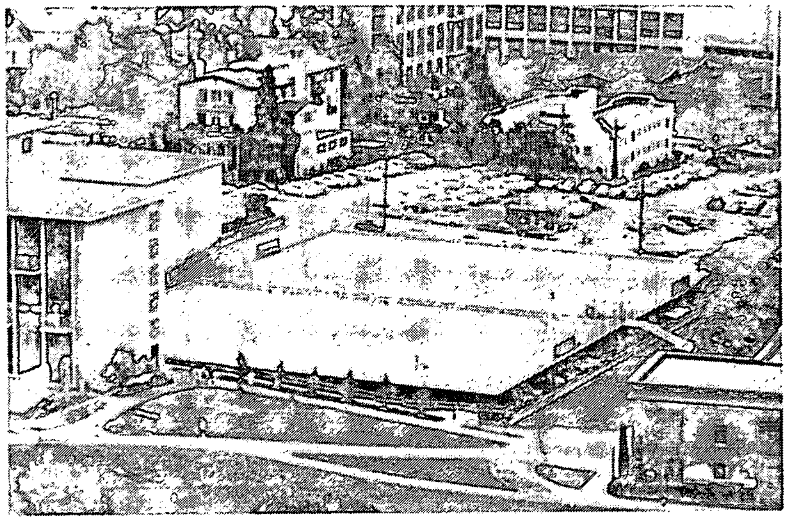

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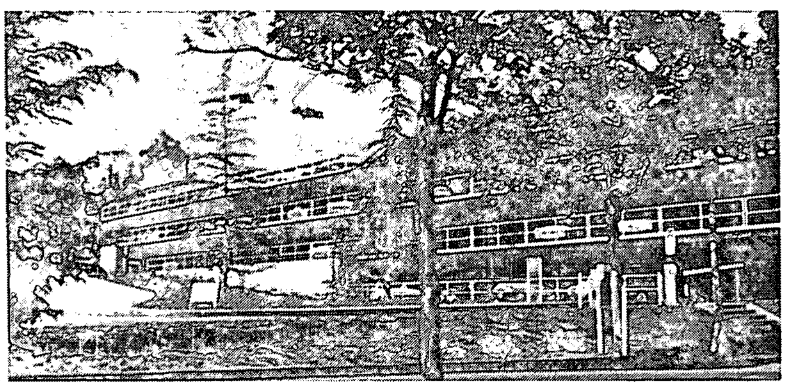


7

5
Parking Lot Exit
6
Garage combined with playfield space
Kroeber Hall Parking Structure (1960)
University of California (Berkeley)
Architect: Gardner A. Dailey
7
Parking Garage
University of California (Los Angeles)
Capacity: 893 automobiles
Project cost per car: $1,157.00
Architect: Welton Becket & Associates

PARKING

A proliferation of obstructions, nefarious devices for puncturing the tires of intruders, jammed intersections, general discontent, missed appointments and lateness for class all belong to that bundle of frustrations called the parking problem. The cause is simple. "Americans have made up their minds to live in metropolitan areas and ride in automobiles," writes the transportation expert, Wilbur Smith.[5] The campus shares the effect of this choice.

In the last two decades, the total population in the United States has risen. At the same time the percentage of automobiles in use has climbed. In 1940 one out of four inhabitants owned an automobile. By 1960, the figure increased to one out of three.

Living without a car is almost impossible on some campuses. A 1962 transportation study at UCLA[6] showed that over 1,000 students (seven per cent of the student body) traveled between twenty-one and forty miles each day to campus. Thirty per cent of the total student body made round-trips of over fourteen miles.

Replying to a transportation questionnaire in 1961,[7] only seven out of thirty-six representative universities and colleges indicated that more than ten per cent of their student body and faculty used public transit. All seven were located in dense urban areas with limited parking facilities.

The journey to campus for student, teacher, and staff increases in length, though not necessarily in time due to the regional highway systems constructed in the "rolling fifties." For example, standards for locating junior colleges in California have been revised from a population service area of twenty-five miles (with the campus as the center of the area) to a service area determined on the basis of 25-30 minutes driving time in any direction from the focal point. College towns have become metropolitan suburbs. Ann Arbor, Boulder, Kingston fell within the shadows of the core cities—Detroit, Denver and Providence respectively—in the 1960 census. Traffic from core city to campus increases as

access from centers of population improves.

The traffic generating aspects of the institutions' changing role also play a part in a growing need for more parking. In 1961 the institutional population composition was as follows at a representative number of universities:[8]

Students	73%
Faculty	8%
Other University Employees	17%
Employees of other organizations working on campus	1%
Visitors	1%

For every three students enrolled, an additional person was attracted to the campus; and a statistically significant number of these people were not directly connected with the institution. Enlarged graduate programs and a higher proportion of married students on campus add to the parking demand, especially as part-time jobs and housing opportunities are dispersed over a wider area. The continuing decline of mass transportation has not helped. Further aggravation comes from that aspect of the collegiate culture seen as a love affair between man and machine—the car as a status symbol.

Automobiles have changed from a luxury to a convenience, and in many places from a convenience to a necessity. As a planning principle, there are sufficient reasons for categorizing parking problems on the basis of luxury, convenience and necessity. To satisfy all three types is an expensive policy. Construction of parking areas costs about $1.50 per square foot for simple paved lots. But the real expense lies in the fact that parking is a large consumer of land—about three hundred fifty square feet to four hundred square feet per user. The automobile at rest takes up more space than that needed for housing a single student. In the space occupied by twenty automobiles, three hundred students could be given instruction.

DETERMINING PARKING PROGRAMS

Determine parking programs through a coordinated appraisal of these factors:

1. Identify the general nature of parking requirements for services and activities supported by the institution. This evaluation will serve as a policy guide by outlining the kinds of parking demands that may be satisfied in the physical plan.
2. With this general policy as guide, estimate the numbers and kinds of spaces required to serve specific groups of people, land uses and activities on campus. Parking needs may be estimated on a population served basis, or by the relationship to land uses. For the first method, determine present ratios of automobile to campus population and project that factor with reference to anticipated campus population. For the second method, determine how many vehicles are attracted by each type of campus land use. Estimate future land-use requirements and in turn future traffic loads.
3. Having identified quantity, make preliminary decisions on the types of facilities that will be required. Determine where these are to be located.
4. After establishing preliminary locations for facility types, then estimate costs of construction and operation of parking faciilties. Alternate schemes may have to be explored. Check feasibility as to site design and staging of construction.

Total parking demands for any plan period will be a combination of remedial measures to improve the use of existing areas, and new facilities to meet future demands. New requirements will be related to: (1) increases in the campus population; (2) changes in parking standards in the existing plant; (3) the availability of land to be added to the physical plant for parking purposes; (4) improvement or deterioration in alternative means of transportation.

Physically, everyone on campus could be given a well designed, convenient parking space—provided yearly charges of $500 to $1,000 per user were made. This seems economically impractical today. Few institutions could afford million dollar subsidies for parking. Few faculty and students would be willing to pay such fees. Since parking cannot be provided for everyone, in programming such facilities, it is important to distinguish between the various kinds of parking required. Two such categories would be *obligatory* and *general*.

Parking for faculty and staff (a fringe benefit for some), parking for visitors (a courtesy), and parking for students who commute (and have no other means to reach campus) constitute the obligatory program. Parking for students in residence is a luxury. Any remaining parking demands are general requirements.

In the survey and analysis stage (see Section III, Chapter 3), existing parking conditions will be identified. The theoretical capacity for existing parking will thus be established. Physical conditions which impede the full utilization of theoretical capacity can be programmed with new needs added to it. An optimum campus parking program would include all obligatory parking and as much general parking as site conditions and financing would permit. Planning modules can be estimated at 350 feet per automobile for underground garages, surface garages and those combined with other structures. Rectangular forms are preferred to square forms in order to allow economic ramp and aisle design. Lot parking modules can be estimated at 100 autos per acre.

The cut-off point for selecting garages vs. lot parking relates to the price of land. When land values have risen to $150,000 per acre, it is as economical to build multi-story garages as it is to acquire land for parking at grade.

8

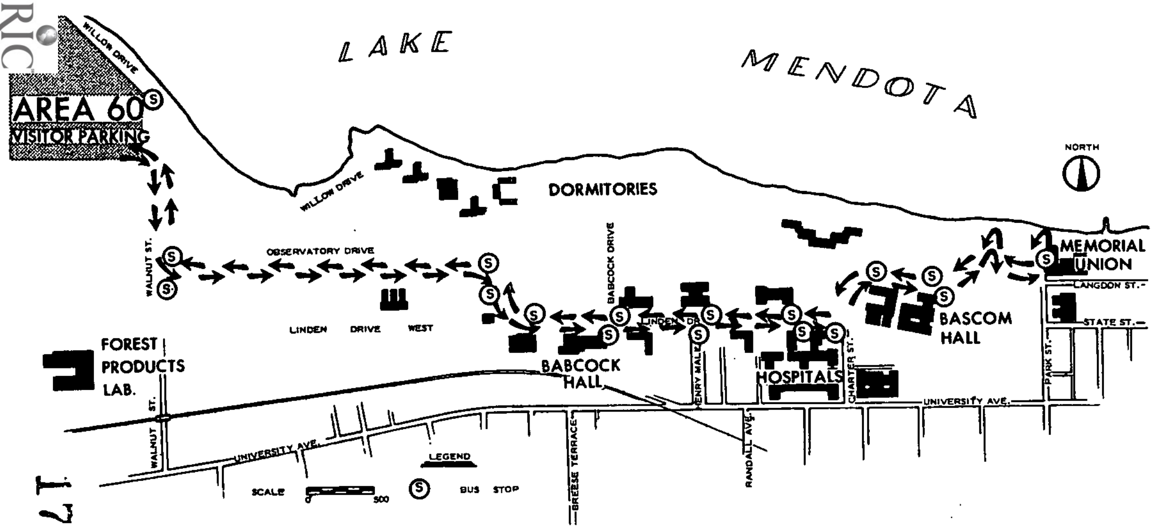
Peripheral parking lots
at the University of Wisconsin campus (Madison) are linked to the main campus by a bus system, thus reducing the amount of parking needed in the central areas.

Reproduced courtesy of:
University Facilities Research Center

9

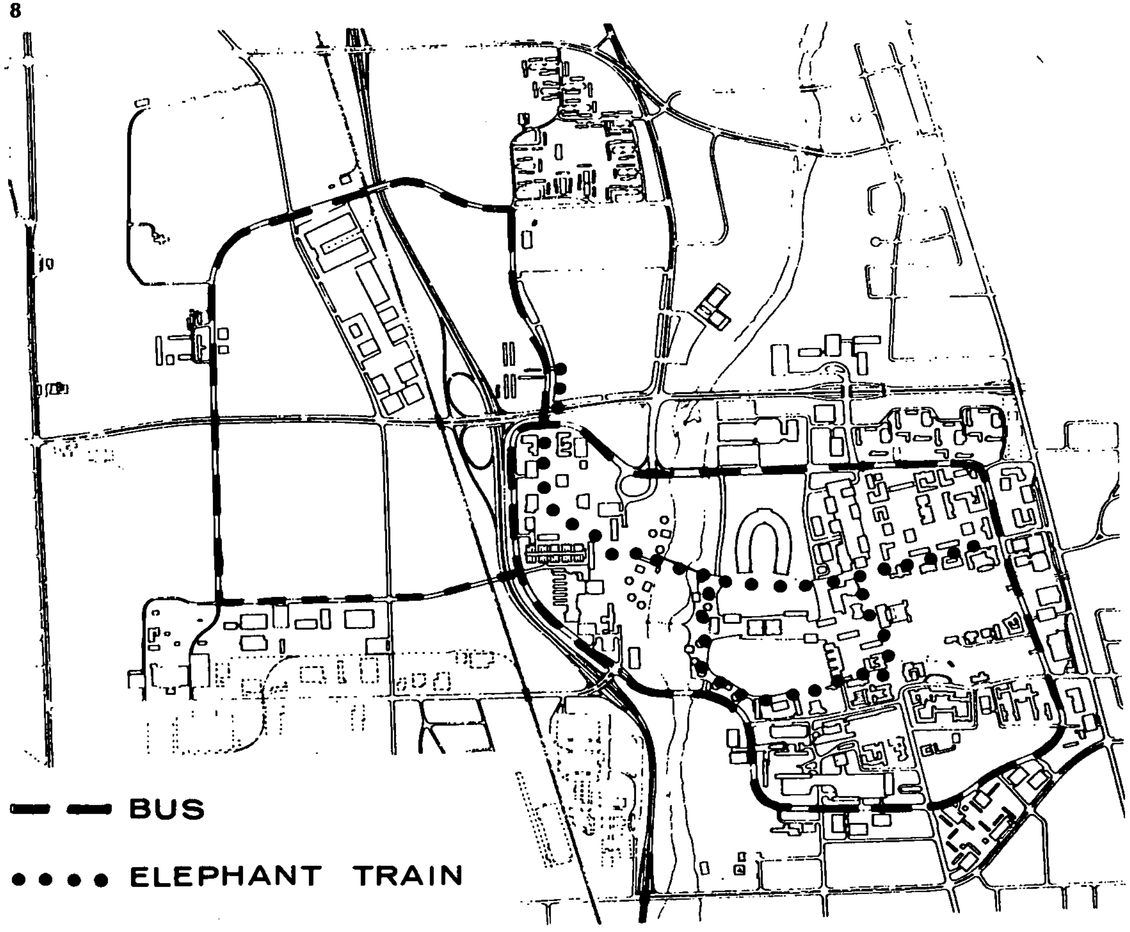
Parking lots and outlying sections
of the University of Ohio will be connected to the main campus by buses and slower-moving "elephant trains" —electric carts similar to those used in fair grounds and zoos.

Plan courtesy of: Ohio State University Planning Office



CAMPUS BUS ROUTE

8



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FOOTNOTES

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"Parking; Legal, Financial, Administrative" (1956)
"Parking," Robert H. Burrage and Edward C. Mogren (1957)

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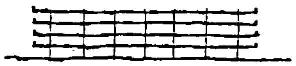
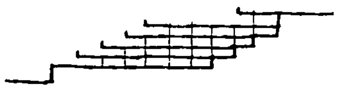
Since parking has been the major factor in the development of two previous concepts for the Medical Center, it is necessary to analyze in greater detail the various types of parking systems in order to refine a further concept development.



TYPE I:

Above Grade: This type of structure is built completely above grade, and is a logical choice when building sites are not at a premium. Extensive use of this type of structure in the Medical Center is therefore limited, due to the scarcity of open land and high intensity of use.

+Cost Ratio: 1.0



TYPE II:

Hillside: This structure can be used against steep slopes in order to reduce excavation work and mechanical ventilation demands. A total concept of hillside parking would be economical in cost, although this might be outweighed by the excessive distance from buildings located in the center of the site.

Cost Ratio: 1.5

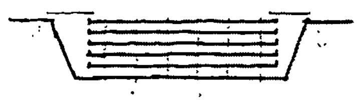
+This number is a direct ratio between the least expensive type parking structure and all other types. Therefore, the cost ratio for "Above Grade", being the least expensive, is 1.0, and a structure with a cost ratio of 2.0 is twice as expensive.

10A

TYPE III:

Depressed: This type of structure would be built completely below grade with a surrounding open "moat" to aid in ventilation. Depressing the structures allows the reclaiming of land by roof decks being utilized as pedestrian and service malls.* Their locations are central to the buildings they serve so that the malls function as connecting links. One major cost factor with this type of structure is the necessity of costly retaining walls around the moat.

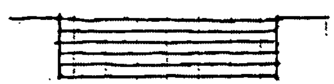
Cost Ratio: 2.5



TYPE IV:

Underground: This solution is essentially the same as Type III in terms of reclaiming land,* its location, and roof deck utilization. The retaining wall problems are lessened as the floor slabs reinforce the walls. A total concept of underground parking structures would be economical only if the areas between and adjacent to buildings were large enough to accomodate approximately 600 or more cars per structure.

Cost Ratio: 2.0



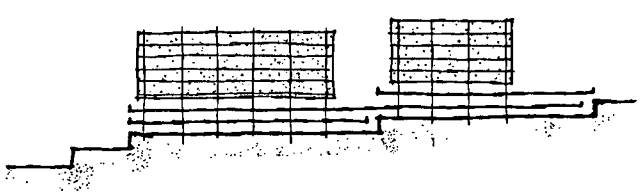
*Reclaiming of land is basically the use of the same site for more than one purpose; it is an essential planning objective when building locations are at a premium on a restricted site.

10B

TYPE V:

Underground with Superimposed Buildings: This combines features of Types I and IV with respect to reclaiming land, proximity to buildings, ventilation, and roof deck utilization. The parking structure is not restricted in size, thereby increasing its potential for economy. Proximity to buildings provides better service connections. The reclaiming of land on top of parking structures for both pedestrian traffic and buildings affords the most intensive use of site. The combining of parking structures and buildings as part of one building program provides for economies in ventilating equipment, mechanical facilities, elevator and stair towers, and structure.

Cost Ratio: 1.7



10C

The following are the five basic requirements for an economical parking structure*:

1.) Minimum Size: 600 cars
2.) Optimum Size: 800 to 1200 cars
3.) Area per car: 330 to 350 sq. ft. per car MAX.
4.) Maximum cost per car: $1800 for Above Grade (Cost Ratio of 1.0)
3600 for Below Grade (Cost Ratio of 2.0)
5.) Utilization of land contours.

The following chart indicates the above requirements relative to the five schemes shown:

	Minimum Size	Optimum Size	Area per car (sq.ft.)	Cost Ratio per car	Utilization of Land Contours
TYPE I	Possible	No	330-350	1.0	No
TYPE II	Yes	Possible	330-350	1.5	Yes
TYPE III	No	No	450	2.5	No
TYPE IV	No	No	330-350	2.0	No
TYPE V	Yes	Possible	330-350	1.7	Yes

*Source of information: H. K. Ferguson Co., Inc., Engineers and Builders, Cleveland, Ohio. The Ferguson Co. has engineered and built municipal parking structures in San Francisco, Los Angeles, Chicago, Pittsburgh, Detroit, and Newark.

10D

10A, B, C, D

Comparative study of parking structure types

From: The University of Michigan
Medical Center Report (1961)

Prepared by: Johnson, Johnson, & Roy

10. Utilities

The co-ordinated construction of utilities, roads and buildings affords considerable savings in campus development. If for no other reason than economy, utilities are an important part of the campus plan. Utilities are matters of engineering expertise, and the checklist below outlines the areas of consideration that should be entertained in any planning venture.

In the design of new campuses, the selection of sites is especially affected by the availability and condition of utility systems off-campus. In expanding old campuses, the problems are usually ones of coordinating new construction so that good advantage may be taken of existing systems. A full review of utilities is warranted in any large-scale planning enterprise. A concentrated planning effort is also a good time to bring base information on utilities up to date. Investigations should be made as to the adequacy of the existing systems. Such items as the pros and cons of changing from one fuel type to another are legitimate areas of inquiry. The introduction of new power and utility requirements may be a critical factor in all aspects of campus development.

The following constitutes a general checklist of items to be reviewed while preparing a development plan.

1. *Heating*. Most campuses in North America will need some kind of heating supply during some portion of the school year. To meet thermal requirements the following fuel types may be used:

a. Atomic reaction
b. Coal
c. Electricity
d. Gas
e. Fuel oil
f. Solar heat

In the present state of technology the choices will probably be electricity, gas, or fuel oil. The choice will vary from region to region, and the following factors will influence the selection of type and heating plants:

a. Costs of raw fuels
b. Availability of alternative supplies
c. Cost of construction of a power plant or the renovation of an existing plant to utilize the fuel type
d. Construction and installation of heating equipment, including pipes, lines and related equipment
e. Convenience of fuel storage and handling
f. Maintenance and depreciation costs
g. Nuisance problems: noise, appearance

Generally a single power plant is preferred over several smaller installations, though beyond a certain size (which must be determined individually in each case) the extravagances of heat loss and dissipation may make it desirable to build several plants. However, this is not a typical situation.

Heat distribution from the central plant may be made through a pipework system carrying either (a) low pressure hot water, or (b) steam or high pressure hot water. Heat dissipating equipment should have excess thermal power to elevate background temperatures quickly to full comfort warmth when buildings are occupied, and down again to background temperatures when buildings are not in use. Background temperatures are the minimums desirable for keeping a building in good condition. Comfort temperatures are those conducive to human occupancy.

For fuel economy it is desirable that heat dissipating equipment be light weight and of small water content. Thermostatic controls should be arranged so that heat can be turned on and off automatically during periods of building occupancy. Individual thermostatic controls are usually provided for areas which are likely to be in use on an irregular schedule. Generally hot water supplies are incorporated in the heating system.

2. *Other power needs*. Electricity is required for general lighting purposes, for operating ventilating and cooling and for special equipment, laboratory use, communications equipment, fire alarm systems, and sometimes for cooking. Depending on the size of the campus, it may be desirable to have a sub-station on campus.

Gas may be used for incineration, heating, cooking, and laboratory uses. Where not available from an outside source by pipeline, provision may have to be made within individual buildings.

3. *Water*. Water will be needed for such purposes as:

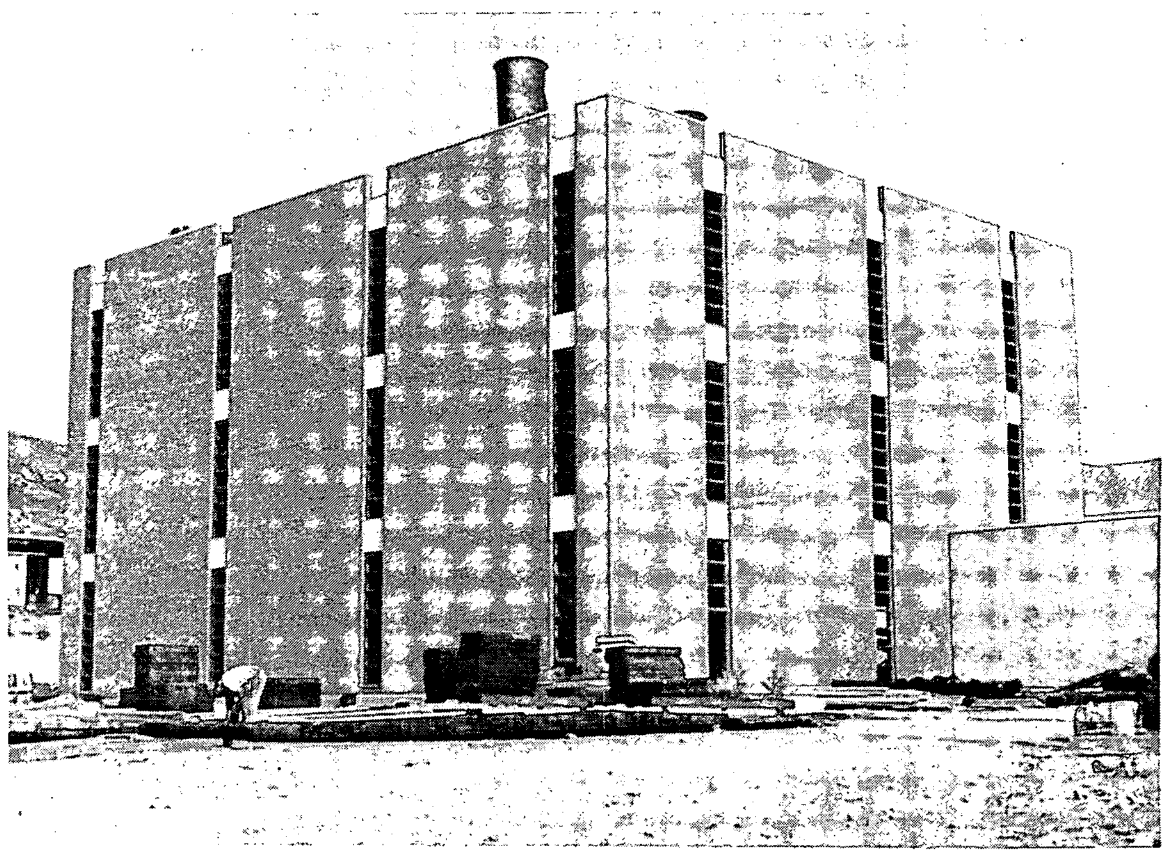
a. Drinking and cooking
b. Cleaning

c. Sanitation
d. Transferring into steam for heating
e. Fire fighting
f. Sports and recreation needs such as a swimming pool
g. Irrigating planted areas
h. As a design element
i. Scientific experiments and research

4. *Surface water drainage*. Water falling on the ground must be disposed of to avoid flooding, erosion, stagnation, and the weakening of structural foundations. The problem of disposal will vary according to the intensity of rain fall in the region, the conditions of the soil, the level of ground water, and the amount of paved and roofed areas present. Generally, surface water drainage systems are kept separate from sanitary disposal systems (see below) to prevent overloading of the sewage disposal plants and back-flooding of sewage in heavy rains. The greater the density of development, the more probable the need for elaborate drainage disposal systems. In low density areas, open surface channels and pools might be introduced and used as part of the landscape.

5. *Sanitary drainage*. The disposal of wastes and effluents is partially taken care of by closed systems of pipes which carry wastes in water to a treatment or disposal plant. Normally, college and university campuses are tied into a local disposal system, and special treatment plants are not necessary on campus. Occasionally in rural areas, however, septic tanks may be needed. Unusual waste problems may also be encountered on campus, particularly in those institutions conducting scientific research. Radiation hazards, the disposal of carcasses used in experiments, and other related waste problems will require special technical studies.

6. *Telecommunications*. The use of television, radio and other communications devices in teaching will increase. Technical assistance in evaluating systems and their physical plant requirements should be secured early in any long-range planning venture.



1
High Temperature Heating Plant (1962)
University of Utah

Though steam has been generally used in most American Universities for central heating, the introduction of high temperature water has exhibited definite advantages as heating medium. Annual savings in using this system at the University of Utah are estimated to be about $32,000 per year over the next ten years.
PHOTO: UNIVERSITY OF UTAH

SECTION III: CAMPUS PLANS

1. Expanding The Campus

EXPANDING THE CAMPUS

Expansion of existing campuses may be accomplished in several ways. The academic year may be lengthened by dropping the traditional summer interlude and operating the school all year round — from bi-semester to tri-semester. Kalamazoo College (Michigan) increased its student enrollment 50% without raising the number of students in residence by using a four semester plan. Co-operative work-and-learn programs can also increase the theoretical capacity of the campus, just as sending students for a year's study abroad can make more space available. Through technical innovations such as television, language laboratories and self-learning programs, additional students can be accommodated. Increasing the size of classes, lengthening the school day and school week, full utilization of facilities through better scheduling or modest improvements in physical plant — all these measures are useful in stretching the campus to its maximum size.

At best, these and similar administrative actions will solve only part of the problems in the decade ahead. If American institutions are to meet their obligations as old campuses expand and new campuses are constructed for the expected increased enrollments, a major comprehensive planning effort is needed — especially if the institutions of higher education are to reflect coherence, order and function in their overall design. Symbolically, steps taken to improve the campus design during a period of rapid expansion have great import for a nation whose cities are dissolving into visual chaos. As the leading edge of thought, institutions of higher education have a societal obligation to search out and engender those methods of physical planning which are useful in their own way to the institutions and have application in other areas as well. Few campuses are organized for this kind of long-range planning today, despite universally recognized benefits which such plans afford. Crisis, not caution— panic, not prudence — engender resolution and action, for planning typically seems to begin with an urgent request for immediate advice on an imminent improvement.

The impetus may come from the insights of a gifted administrator returning home from an educational conference; from an architect frustrated by having to solve a building problem without the benefit of a master plan to site his commission; from a fund raiser meeting resistance from alumni who are unwilling to contribute to a future which has no physical form; from a crisis caused by the discovery that the best location for the new library was used last year for the buildings and grounds repair shops; or from a sudden benefice from a private donor for a memorial which all agree must have a special place on campus, prominent but not in the way of future construction.

Under such conditions it would be best to begin the process of decision making by preparing a development plan. The strategy of starting with such a plan can be justified by the need for long range projections of land requirements and site locations in order to determine placement of the earliest construction. Also, the program for development plans can be sufficiently detailed to warrant a full commitment of resources for implementing the first projects.

Physically, expansion requirements can be met in many ways, ranging from:

1. *Renovations*. Modest or extensive renovations can be carried out to increase and improve the quality and amount of useable space in existing buildings and outdoor spaces.
2. *Accretion*. Wings and floors may be added to existing buildings; or sizeable sections of whole new buildings may be fitted between existing buildings.
3. *New Construction*. When constructing new facilities, campuses may grow at their existing scale — either horizontally or vertically. (Where elevators are not needed for major circulation, the campus scale is considered horizontal.) Campuses which are horizontally scaled may meet their expansion requirements by gradually changing to a vertical scale as they construct taller buildings.

All these maneuvers may be completed

on land owned by the institution. A second series of expansion moves depends on increasing the institution's land holdings. The transactions may range from:

4. *Land Assemblage*. Individual parcels of land may be acquired and then used for institutional purposes, or held until sufficient parcels have been assembled for construction of a new facility or group of facilities.

5. *Satellite Campuses*. Occasionally, expansion needs cannot be satisfied on campus or in its immediate environs. The institution may then construct satellite campuses. These differ from new campuses in that they remain administratively under single control and are subsidiary rather than primary facilities.

6. *New Campuses*. Expansion may necessitate moving the existing operations to a new campus sufficient in size to accommodate present and long-range needs.

All of these actions will be illustrated and described in subsequent chapters.

Development plans

Development plans are described in detail in this section because they illustrate the full range of campus planning problems. The guidelines suggested in these chapters are also applicable to pilot plans. The steps and procedures are the same, whether planning begins as a stop-gap measure or is a result of calculated appraisal as to what must be done to control campus growth.

Development plans are collections of related documents, maps, charts and models covering these points:

1. The educational objectives, otherwise known as the academic plan.
2. The time span and target dates for effectuating educational goals.
3. The criteria to be used in determining what physical facilities and improvements are to be included.
4. A specific accounting of physical facilities improvements required on campus including land, circulation, utilities, and buildings on campus; and where necessary, a description of improvements needed in the environs.
5. Design plans and/or models showing how the physical improvements are to be arranged on the land.
6. A description and justification of the order in which improvements are to be made.
7. An estimate of costs for implementing the plan.
8. The preparation of other supporting documents as needed to explain or support the various recommendations.

How intensively each aspect is studied will depend on the purpose of the plan. The determination of purpose is, in itself, important.

Steps to be taken in preparing the development plan

Assuming that the need for planning has been recognized, its preparation falls into five distinct phases of work.

1. *Organizing for planning*. There are many methods by which a development plan can be organized administratively within the institution. Outside consultants may also be used. The selection of a course of strategy and the tooling-up for planning are necessary first steps. Because of the many different kinds of planning situations encountered in diverse institutions of higher learning, goals, objectives and procedures must first be identified so that planning may proceed with dispatch and efficiency.

2. *Survey and analysis*. To arrive at reasonable solutions for long-range development, the campus and environs are studied in order to understand the operations and conditions which must be respected, overcome, ameliorated, integrated or avoided in determining the best alternatives for development.

3. *Programming future improvements*. The essential aspects of programming are: first, an understanding and clarification of the institution's educational objectives; then, a determination of how many people and what kinds of facilities must be accommodated to meet those objectives. The facility requirements may be listed by function, such as the nine categories described in the previous section.

4. *Plan formation*. Planning alternatives will emerge quite early. By no means is the design process a rationale, sequential series of deliberate actions. However, the major decision-making activity occurs after the survey and analysis stage, and the formulation of a preliminary program. In the plan formation stage, various facilities (land-uses, buildings, circulation, utilities) are located in accordance with the program instructions. The resulting design is tested, modified and adjusted until each various part forms a coherent whole — one that can be justified as to cost, staging of development, aesthetics and function.

5. *Implementation*. A development plan is not complete unless it indicates the first steps which can be taken towards achieving the goals. It must include design controls to guide future development, and at the same time make provision for the changes and revisions which will inevitably take place.

Each of these phases is described in Chapters two through five in this section. Chapter six contains a selection of development plans, chosen because they illustrate many of the current issues, principles, problems and solutions in campus planning. Because urban renewal and redevelopment opportunities are beginning to have a significant effect on campus expansion, this particular aspect has been given a separate chapter (7). New campuses and their special planning problems are reviewed in Chapter eight.

2. Organizing for Planning

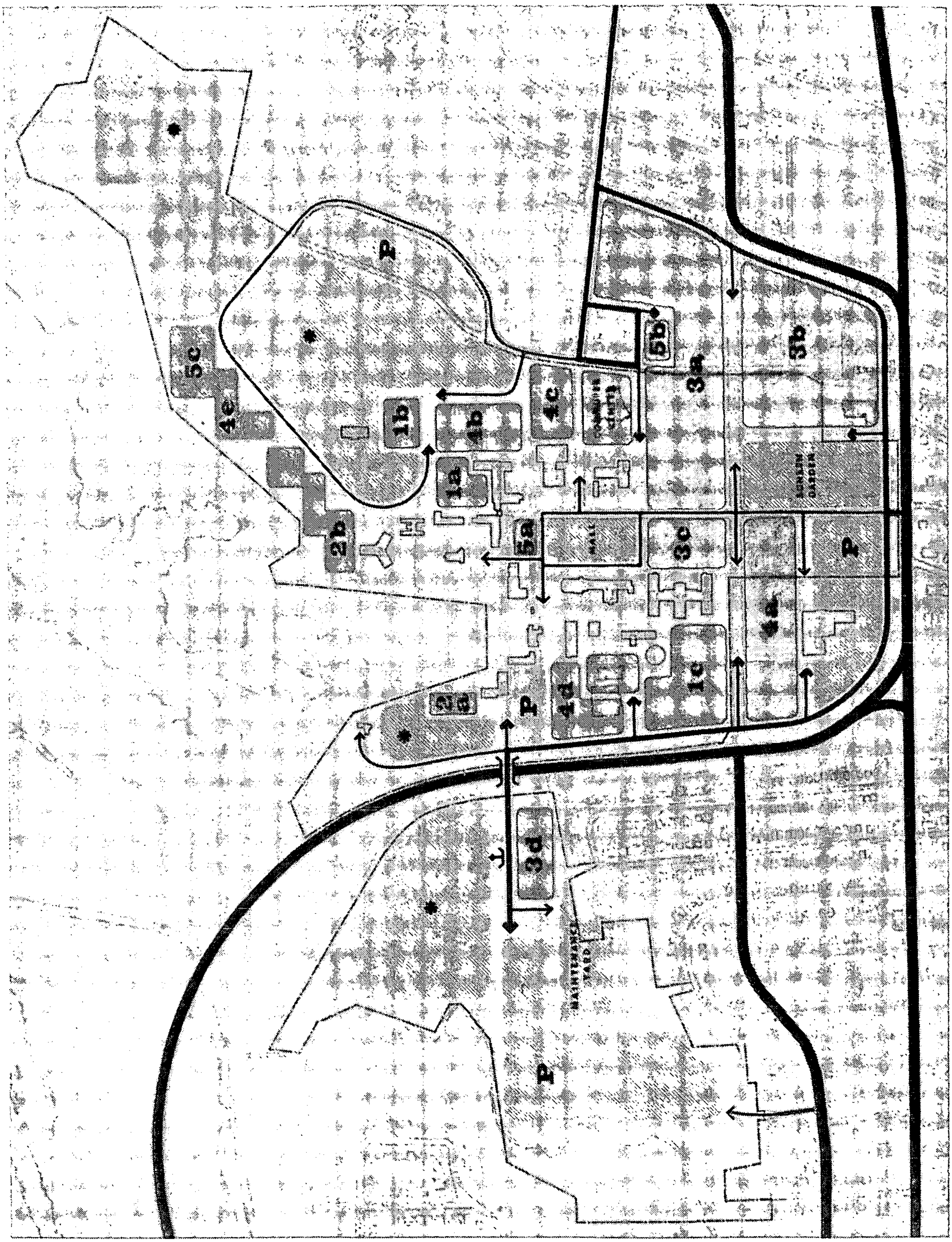
ORGANIZING FOR PLANNING

To state that planning should be planned may seem redundant, yet process and procedure to a large extent control ultimate results. The manner in which planning is organized will depend upon the size of the school, the degree of experience which members of the institution have in such matters, the budget allocated for it, the amount of control exercised by the chief administrative officer and the general purposes of the plan.

In suggesting what must be done in terms of general principles, due weight must be given to the exceptions. Occasionally, abbreviated expenditures of energy, time, and money for preliminary planning studies give satisfactory answers where a full commitment may be impossible or unnecessary. The following are some common situations:

1. *Fund-raising activities*. Institutions launching fund-raising campaigns find it difficult to allocate money for planning studies, even though some concept of the future development is necessary to create an image of what that future might be. A modest investment in planning studies, however, can help establish a reasonable program for development, identify in a general way the critical problems at issue, and justify the institution's approach to their solution. Preliminary planning will establish a basis for illustrating future solutions sounder than simple artistic license. The success of the fund drive may determine the amount of construction, so the program for development need not be detailed. Fund raisers believe that preliminary planning of this kind gains the respect of potential donors who feel secure that reasonable thought has been given to development problems and priorities for growth. This type of plan should never be promoted as the final solution.
2. *Pilot planning studies*. To test what has to be done to prepare a development plan, a "dry-run" can be organized. By using reasonable assumptions rather than facts, a synthetic plan may be produced which will be useful in pinpointing special problems, as well as in identifying gaps in data. As noted earlier pilot plans can serve as background context for making decisions that cannot be postponed until the final development plan has been completed.
3. *Site accommodation studies*. Pressed for time and with no overall plans available, decisions can be made on building sites, for example, by preparing a series of alternative sketch plans for future development. These should range from utopian to fairly conservative estimates for development patterns. Through comparisons, major planning factors may be isolated and a reasonable guess established as to an appropriate solution for the problem under review.

To be useful, site accommodation studies require full mobilization of the institution's resources for an intensive study period. Such studies are expensive and disruptive to the daily routine, though cheaper than preparing a development or pilot plan. They are best reserved for emergency situations.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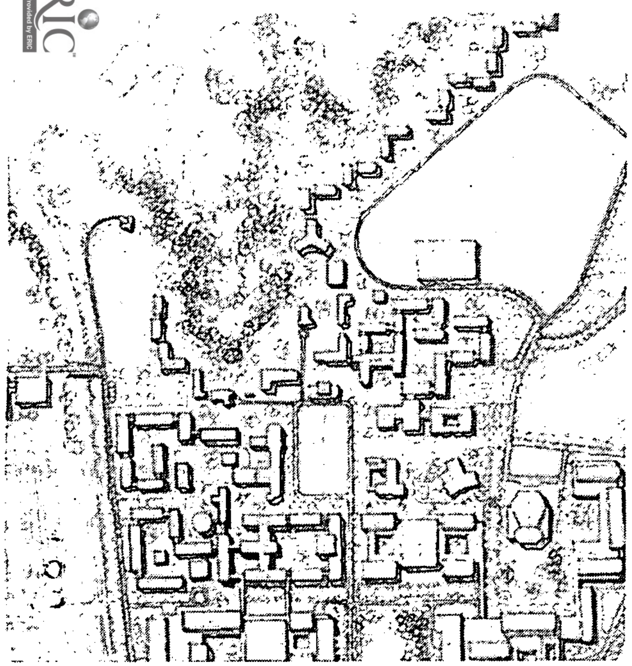

1B 1A, B

McMaster University Pilot Plan (1963)
Hamilton, Ontario
Prepared by: Sasaki, Walker & Associates, Inc. and Sasaki, Strong, & Associates, Limited

Expansion of the campus was hampered by the splitting of the University's lands into non-contiguous parcels by through streets, important community facilities and land not owned by the University. The Pilot Plan directed its attention to the question of guiding long-range growth in such a manner that immediate facilities could be sited against the background of a reasonable long-range land development pattern. The alternative shown above indicates the arrangment of future land uses and a basic circulation system which carries traffic around the boundaries of the future campus. Existing buildings are shown in outline form. This is an example of how a Pilot Plan can guide development from a stage that is immediately feasible to a future which is probable and possible—yet leaving room for other alternatives beyond the first stage should new conditions and requirements have to be considered. Pilot Plans of this type can also be given a design image which conveys the pattern of buildings and open spaces. The drawing shown above is a typical quick sketch technique which helps communicate the design intention, without commitment to an ultimate solution. The building shapes are planning modules drawn to scale and derived from a program prepared especially for the Pilot Plan. Numbers on the drawing refer to staging sequence and letters to priorities in the program.

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TYPES OF PLANNING ORGANIZATION

There are many different methods of conducting planning, of which the following five techniques are prototypes. The methods have been somewhat simplified in their descriptions so that comparisons may be made of their advantages and disadvantages. Since this book focuses on physical planning, other aspects of institutional growth have been subordinated.

1. *Self-study committee*. Committees are organized from within the institution and are assigned special topics relating to institutional development. Their function is to study and make recommendations on such matters as the library, physical plant, housing, educational objectives and related issues. The individual committee reports are co-ordinated and organized into a single document, which is then passed around for review. After scanning and screening, the major recommendations agreed upon (along with minority reports) are forwarded to the administration and the Board of Trustees. Suggestions in the report may include priorities for physical plant development, as well as other policies which the self-study committees feel have relevancy to campus growth.

In a variation of this method, the department heads and deans are assigned the responsibility for assessing future requirements. The resulting documents, if accepted by the administration and approved by the board, serve as a guidepost in making physical plant development decisions, and in selecting priorities for action.

This method is favorable to schools with small enrollments and slow growth patterns.

2. *Consultant study*. Under this method the institution commissions a consultant to prepare a development plan. A survey and interview technique is used to compile basic planning data and to ascertain educational objectives. The consultant works directly with the chief administrative officer or his representative. From within his own staff, or by coordinating the work of other specialists, the consultant-planner defines basic policy areas and establishes programs for development which are forwarded in document form to the institution for review and approval. On the basis of previously determined policy, the development plan is sketched out as a preliminary design. This is reviewed again; necessary modifications are made; and a final development plan submitted.

This approach is favorable to schools with small enrollments, faced with a surge of new construction but committed to limited growth.

3. *Institutional staff*. This involves establishment by the institution of a full-time staff for the preparation of the development plan. The officer responsible for planning may, from time to time, engage consultants for special technical problems. The head of the planning staff reports directly to the chief administrative officer, who in turn establishes educational policy and priorities for development, sometimes with the help of a planning committee which meets occasionally to review the staff's work. Major decisions and policies are reviewed by the board of trustees.

This method is favorable to medium size institutions where vis-à-vis informal contacts may be maintained, and where growth is slow or limited.

4. *Institutional staff* and *planning committee*. This variation interposes a planning review group between the institutional planning staff and the chief administrative officer representative of the entire institutional community. The committee may initiate studies through the planning staff, as well as review and make recommendations on planning matters. It maintains a regular agenda and is a formal instrument in guiding campus development. Consultants may be brought in on special matters.

This method is favorable in institutions having large enrollments, where development and construction go on at a fairly uniform pace.

5. *Consultant-planning-administrator-committee*. In this variation of Method Four, the consultant provides staff services to the

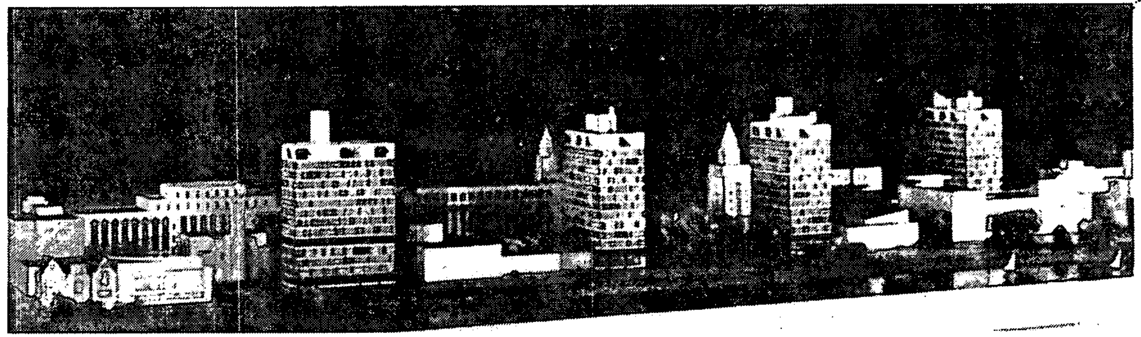
institutional planning committee. His activities are co-ordinated on a day-to-day basis by a member of the institution's administration, who is assigned the full time responsibility for planning. The administrator-planner acts as liaison between the consultant and the institutional community.

Such an approach is favorable to institutions which have to "catch-up" by having a development plan prepared by a consultant, and at the same time wish to instigate a method for continuous planning once the development plan has been established. Within this framework, the consultant may provide specialists' services to the institution on a continuing basis once the development plan has been completed.

All five methods have the advantage of affording basic guides to future development. Some methods are better than others for physical planning. Each can be judged on the basis of how well the technique will meet certain all inclusive physical planning objectives. Without reference to specific cases, the major overall objectives can be summarized as answers to the following questions:

1. Is there institution-wide representation and participation in preparing a good planning program and later giving the support required for implementation of the program and plan?
2. Are the educational objectives of the institution clearly articulated? Does the resulting physical form accurately reflect the consequences and advantages of whatever development is undertaken to meet the educational objectives?
3. Has there been a balanced examination of the program requirements so that unity and coherence can be achieved in the resulting overall physical form? Is there sufficient flexibility to meet changes in growth, while at the same time maintaining continuity in the physical environment, especially its aesthetic and symbolic manifestations?
4. Are there clear and sufficient policy statements as to what relationships are desired among parts of the campus pertaining to matters of educational alignments, social objectives, administrative control, intercommunication?
5. Is the planning comprehensive in that it relates the campus to the community of which the institution is a part? Has the "town-gown" environment been effectively examined with respect to the institution's physical setting and economic life, land-use relationships, circulation patterns, the quality and compatibility of surrounding activities?
6. Have priorities been established between alternate courses of action? Have priorities been assigned to the staging of development?
7. Is the development plan technically sound from the viewpoint of architectural implementation, site engineering and land planning?
8. Is the plan realistic as to costs?
9. Do the solutions reflect current advances in the art of physical planning and the science of institutional development?
10. Once planning decisions are made, do they allow for revisions and modifications as new issues and information are uncovered?

For purposes of general comparison, each method can be identified as to its chances for success in meeting these objectives, as shown in Table 16.



2
Boston University Site Accommodation Study
Model of site accommodation studies carried out to appraise the capacity of the institution's land holdings to accommodate building space irrespective of firm programs for immediate development.
Photo courtesy of the architects: Sert, Jackson and Gourley

Table 16:
Diagram of Anticipated Results in Planning Methods

METHOD	1	2	3	4	5
1. Participation and representation	L	U	U	L	L
2. Educational objectives	L	L	L	L	L
3. Comprehensiveness of the whole	U	L	L	L	L
4. Relationship of the parts	U	U	L	L	L
5. Town and Gown	U	L	L	L	L
6. Priorities	L	L	L	L	L
7. Technical aspects	U	U	L	L	L
8. Costs of implementation	U	U	L	L	L
9. Currency	U	L	L	L	L
10. Continuity	U	U	L	L	L

U: unlikely L: likely

There are ten aspects of planning which must be considered in evaluating strategies. These aspects can be listed and correlated to the various methods of planning, and the resulting diagram used as a summary in deciding which method is likely to produce the best results for a particular situation.

ACTICAL CONSIDERATIONS IN ECTING A METHOD FOR PLANNING

Two salient features emerge in the comparison diagrammed above: good planning requires broad participation and objective technical competence. The desirable "mix" in organizing campus planning combines committee contributions with the help of specialists.

Full participation makes sense for several reasons. Institutions differ from each other in size, educational organization, growth patterns, prestige, composition of student body, faculty and alumni, and sources of development funds.

Many of these items can be accounted for objectively. There are other aspects of the institution which cannot so easily be grasped. They belong to that category of events which led Matthew Arnold to describe institutions of higher learning as the "home of lost causes, and forsaken beliefs, and unpopular names and impossible loyalties." Within the time and budgets usually allocated for planning, few outside consultants can grasp these matters in sufficient detail to include many intangible factors in planning. Campus politics and local traditions imbue every issue with a flavor peculiar to the individual institution. What makes sense in the ivy-covered East may have little acceptance in the Rocky Mountains. Proper regard for the underlying considerations can be made by representatives of the institution who participate in planning.

In organizing planning, there must also be an effective method to reach decisions. Judgments will be needed on various alternatives presented during the course of preparing the plan.

"A successful campus plan, like a good building plan, must be tailored to fit the educational program to be served by the physical facilities. With this principle in mind, the campus planners conducted almost one hundred interviews with over three hundred people (administrators, faculty and students) to determine their concepts of the future educational program and organization. The planners found widespread opinion that changes ought to be made, but very little agreement as to the nature of these changes."[1]

There are always choices to be made. What may be good for one section of the academic community may impose a burden on another. Grade parking on the periphery of the campus, for example, may be an inconvenient walking distance from destinations. The distance factor may discourage the use of the library by those not living on campus. Parking garages may make for accessiblity, but there can be resistances to paying for the structures.

The advantages of having open spaces between residential units used for informal recreation may be offset by the nuisances and noise that disturb those wanting to study nearby. The psychology department may be aligned with the biology department under the present chairman's direction, but with a new center for the behavioral sciences in the offing, would psychology be better sited closer to the sociology and anthropology departments?

These are simple examples; conflicts which reason will overcome and administrative leadership will help resolve. Decisions of this kind cannot be left to an outside authority, whatever his stature, for institutions of higher learning do not conform to a pattern of behavior that resembles business, industry or government.

Writing about "The Academic Community," John D. Millet noted that the campus ". . . abhors absolute power. It is committed to freedom through sharing power. Consensus in action is the test of both freedom and responsibility."

In planning, members of the institution can share power in three ways:

1. *Decision makers.* These are the people legally responsible for choosing between alternatives, establishing policy, and seeing that policy is carried out once it has been made.
2. *Advisors.* These people may constitute a formal or informal review board on special aspects or all phases of campus development. Advisors review and recommend but have limited decision-making power.
3. *Staff.* These are the people responsible for carrying on whatever campus development studies are required to formulate policy and to carry it out. The staff serves both the advisors and decision makers, but does not sit in judgment.

By keeping each of these areas separate and distinct, it is possible for members of the academic community to participate in planning in a fashion appropriate to their responsibilities, talents and experiences. The decision-making process is not paralyzed. In his book, "If The Gown Fits," A. P. Rowe has written that control by persuasion itself is impossible. "No organization works that way, not even a monastery, and it does not suffice an institution spending several million (dollars) annually."[2] The passengers must be separated from the pilots. Only then can the staff be free to make objective studies.

In establishing policy review boards with duties distinct from staff and decision making, a very human failure can be minimized — an obstacle that Max S. Marshall makes clear in this quote:

"The frequency with which academic folk by committee appointments are made into architects because they got a Nobel prize in chemistry, or into a certified accountant because they discovered a new anti-coagulant for blood is astonishing. The only thing more astonishing is the number of times these academic folk accept such jobs, posing as experts."[3]

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STEPS TO BE TAKEN IN ORGANIZING FOR PLANNING

Each campus presents a special set of circumstances. If it is agreed that organization for planning must represent a set of checks and balances, and planning is to be a continuing operation, the following general procedures will produce good results in most instances. Steps in organizing for planning:

Step 1.
Establishing a steering committee for planning.
Step 2.
Staffing the development plan study.
Step 3.
Setting up a work program.
Step 4.
Forming a campus development committee.

STEP 1. STEERING COMMITTEE

Organize a campus planning steering committee from within the institution to:

a. Determine the general objectives of the development plan
b. Survey the resources available on campus, particularly personnel for such committees
c. Determine budget limits
d. Establish a time schedule
e. Select or appoint appropriate staff

Bring in an outside planning consultant to advise on what has to be done if the institution's administration has not had previous experience in this area.

STEP 2. STAFFING THE PLANNING STUDY

Campus development is an extensive matter, involving millions of dollars in construction and sizeable annual budgets to operate facilities once they have been built. Many decisions, such as a building or road location, cannot be easily reversed once accomplished. Highly technical skills are needed in campus development, such as those represented in the following list of specialists used by the author in preparing a development plan for a major Eastern university:

a. Architects
b. Community planning and renewal specialists
c. Demographer
d. Education specialist (curriculum)
e. Civil engineer
f. Food operations specialist
g. Highway engineer
h. Landscape architects
i. Management consultant in fund raising
j. Real estate appraiser
k. Traffic and parking specialist
l. Structural engineer
m. Utility engineer (heating, plant and sewage)

Obviously no one person is likely to have all these skills and experiences. Several of the specialists — planners, architects, and landscape architects — by training have the overall perspective necessary to co-ordinate large-scale planning, and it is from this group customarily that supervisory and technical positions are typically filled.

Depending on the size of the institution and the amount of planning to be carried on, the staff may be:

a. An individual from within the institution assigned full-time responsibilities for campus planning.
b. An office or section of the institution's administration assigned to this function.
c. A planning consultant engaged to provide professional services.
d. A combination of any three above.

CRITERIA FOR SELECTING CONSULTANTS

Assuming that a steering committee has met and that a consultant is to be engaged to prepare the development plan, or significant parts thereof, the next step is to interview several candidates. Obtain names from:

1. National headquarters or regional chapters of professional organizations such as:
   a. American Institute of Architects
   b. American Institute of Planners
   c. American Society of Landscape Architects
   d. American Society of Planning Officials
2. Deans or department heads of professional schools in architecture, landscape architecture and planning.
3. Institutions which have completed development plans.

Evaluate consultants on the following criteria:

1. The consultant should have on his staff planners, architects, landscape architects, engineers and other specialists needed to conduct a large-scale planning study. These skills may also be provided through a joint venture in which either a planner, landscape architect or architect serves as principal co-ordinator. A joint venture is a confederation of specialists legally incorporated to provide professional services under a single contract.
2. The consultant should be familiar with programming and designing facilities for higher education; with special emphasis on an understanding of how an institution maintains communication between its constituent parts, the nature of administrative control and academic alignments.
3. The consultant should have experience in cooperative planning with local, state and federal agencies with reference to land-use development, traffic and circulation, zoning, urban renewal and redevelopment.
4. The consultant should show in the form of previous commissions, evidence of competence in environmental planning, with proper regard for human values and aesthetics.
5. The consultant should be experienced in matters of cost control, and be knowledgeable about the economic restraints which institutions face in physical development.
6. The consultant's own staff should be sufficiently experienced to work in close rapport with the institution's representatives throughout the planning.
7. A principal member of the consultant's firm should be available to direct the entire planning effort toward the conclusions outlined in the work program.
8. The consultant should have either physical proximity to the institution or demonstrate an effective method of maintaining

ommunications throughout the planning ges.

9. The consultant should be available to start on schedule and be free from other commitments that might interfere with meeting deadlines.

STEP 3. THE WORK PROGRAM

If a consultant is used, a contract should be entered into in order to prepare a *work program*. This is a key step. Professional fees for services on campus development cannot be estimated on a percentage basis. Planning is filled with so many variables that it is not wise for either consultant or client to work on a cost-plus basis, or on a fixed fee without determining in advance what is to be done. In the work program the consultant will:

a. Evaluate the planning and development problems which the institution faces.
b. Suggest surveys and studies necessary to resolve the problems.
c. Establish the institution's responsibility for providing data, information, liaison, and related items.
d. Outline the type of documents, drawings, plans, studies and services the institution may expect during the planning study.
e. Describe the instruments by which these studies and services will be communicated to the institution; i.e., the number of presentations, number of reports, etc.
f. Set up approximate due dates for the services provided.
g. Establish budgets and fees for the development plan.

There are two methods for calculating fees and costs of services for preparing the development plan. The institution may provide the consultant with the approximate figure that it has allocated for planning studies, and the consultant will in turn tailor his proposal to fit that budget. Where the budget is low, the consultant may indicate why a larger work program is necessary. In the second method the consultant may recommend in his proposal a planning appropriation to cover the anticipated professional fees, contingencies and other items. Contracts should include provisions for modifying the terms of the contract on a basis agreeable to both parties, for the original impetus for planning may later prove to be only a symptom of a larger and more complicated problem.

Upon receipt of the work program, the institution has a firm proposal for planning services tailored to its individual problems and requirements. The institution can then proceed by executing the contract with the consultant and appropriate the recommended funds, or the institution and consultant can make modifications in the work program.

The consultant should be paid for preparing the work program on a time expended basis, with an upset figure; or a flat fee.

The advantages of the *work program* to the client are:

1. Professional appraisal of planning problems.
2. Definition of the institution's responsibility in the planning effort, which gives it sufficient lead time to mobilize for administrative organization and control.
3. Definition of expected results.
4. Economy.
   a. a firm estimate of anticipated costs
   b. reduction in "tooling-up" time by outlining steps and procedures
   c. establishment of immediate rapport and advantageous working conditions by identifying "who" is to to do "what" and "when"
   d. no built-in hedge factor to fee, which might be necessary if firm agreements on work programs are not made in advance.

The advantages to the consultant, in addition, are:

1. He is not forced to speculate and hedge on fees.
2. He can allocate in advance his resources for planning and better arrange his staff time to fulfill his various contractual obligations.
3. A firmer understanding of the institution's specialized problems and conditions is gained.
4. Satisfactory conditions for doing a professional job are established.
5. The client has a firm understanding of what has to be done, and what can be expected from the planning studies.

STEP 4. THE CAMPUS DEVELOPMENT COMMITTEE

Assuming that a consultant has been engaged to prepare a development plan; that a member of the institution has been assigned the task of coordinating the day-to-day activities during the planning period and will later assume the responsibilities of campus planner; then the next step is to establish a campus development committee representative of the institution to serve as a review board during the preparation of the development plan and later act as a long-range planning committee.

The committee should include at least one member from each of the following groups on campus:

1. Administration
2. Business Office
3. Building and Grounds
4. Dean of Students
5. Dean of Faculty
6. Faculty
7. Library

Some of these members may have served on the steering committee. The full committee will review the consultant's work at the end of each phase of the work program. Depending on tempo of construction and policy decision making, it may meet periodically. The president and a representative of the board of trustees may be *ad hoc* members. The institution's planner (or planning co-ordinator) will serve as secretary, and along with the committee chairman be responsible for preparing the review agendas.

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INSTITUTIONAL STAFFING

When the institution carries on the planning function from within, then assignments should reflect the necessary professional experience and training to carry out the activities listed earlier. While the development plan serves as a focus in the initial effort, staffing decisions should reflect the fact that planning will be a continuous activity. Among the two thousand colleges and universities there are probably about one hundred institutional personnel who are designated by title or job description as planning officers. The following duties fall within the purview of campus planning as an on-going activity.

Typical duties fall into five categories of activities:

1. *Intelligence function*. This involves measuring and evaluating existing activities and physical plant; and secondly, predicting which of those items will be affected in the future by changes in curriculum, institutional goals, and enrollments.
2. *Community relations function*. This activity involves all those studies, communications, meetings, and measures necessary to coordinate institutional and community growth objectives.
3. *Programming function*. These duties include the identification of development problems, the posing of alternative solutions, and the preparation of those documents necessary to ensure that project designs will reflect long-range development policy.
4. *Physical plant development*. This activity may include the preparation of capital improvement budgets, the preparation of preliminary and final project plans, and the supervision of construction.
5. *Secretariat function*. This includes the responsibility for keeping all records, documents, and other materials necessary to carry out planning, programming, physical plant development, and whatever related tasks are assigned to the planning office.

There are many advantages for the institution in having its own staff planner, most often called the *Planning Officer*. He will have an intimate knowledge of the institution's day-to-day operations. He is identified as the focal point of the two-way channel of communication which is needed both formally and informally to keep activities current on and off campus. Through his day-to-day routine, the planning officer can link all aspects of institutional growth to the development plan. Having a full-time member of the institutional staff responsible for planning makes it possible to meet new problems head-on. One of the major difficulties encountered with consultant help is the time lag between the identification of a problem and the response necessary to find a solution.

Another important but intangible function which is also assigned to the planning officer is his role as the conscience of the institution. In his rewarding essay on "Innovations," Francis Bacon notes:

"It is true that which is settled by custom, though it not be good, yet it is fit; and those things which are long gone together, are as it were, confederate with themselves; whereas new things piece not so well; but though they help by their utility, yet they trouble by their inconformity, besides they are like strangers, more admired and less favored."

By encouraging change, yet curtailing impulsiveness; by engendering innovation, and at the same time softening any harsh side effects of change, the institutional planner, through his day-to-day work, may help overcome the largest obstacle of all — inertia.

Though all the above functions are part of planning, not all are presently combined under one title or under one office on most campuses surveyed by the author. Planning, as described in this book, is a relatively new venture. For example, there isn't yet a body of experience sufficient to indicate where the planning office should be placed. Planning might be a sub-activity of:

1. Physical plant operations.
2. Budget and fiscal management.
3. The president's office.

There is no clear pattern. If students and faculty are the core of the institution, planning as an administrative function would be concerned with establishing long-range goals for selecting a student body and recruiting a faculty, and then building a physical plant around these two groups which would meet their needs. If planning is solely a reflection of financial feasibility, then its potential for creative innovation may be obscured. If it is not much more than putting together a workable set of buildings — however functional and aesthetic they may be—then planning is not far advanced beyond project design.

It is difficult to suggest at what point in enrollment a planning officer should be added to the institutional staff; or what volume of construction makes it desirable to coordinate all development; or what kind of institutional administration can best be served by planning. And which profession has best equipped its members to serve as a planning officer? The architect, insecure in dealing with intangibles of planning? The non-physical planner naive as to technical matters, perhaps even insensitive to design? These speculations, too, point out how unlikely it is that general rules are sufficient. The steps suggested in this chapter should help until that moment in time when the institution has been able to measure its own progress and respond accordingly.

SUMMARY

The foregoing suggestions are naturally illustrative, and each institution will vary these general recommendations to meet its own special requirements. Good planning searches out a broad base of opinion for decisions and support. But planning does not stop with completion of the campus plan. Modifications and changes will have to be made to meet new conditions and situations. Planning, as an on-going activity, can best be given important continuity by those representatives of the institution who have served from the beginning, and who understand the foundations on which the plan is built. For understanding and continuity, it is desirable that many participate in planning.

The balanced effort will include both institutional staff and outside consultants,

er planning consultants (generalists) or nical consultants (specialists) such as those listed earlier. As back up support, these individuals have the advantage of a wide range of current experience. Because consultants are not easily identified with any one faction on campus, their objectivity is useful in coordinating a desirable consensus. Consultants can be used effectively in the "catching-up" period which is inevitable when an institution has just begun planning. Also, consultants are especially important in crash programs, when it is difficult to organize planning within the institution in a short period of time.

FOOTNOTES

1. Memorandum on the O.S.U. Campus Planning Study—Phase I; Office of Campus Planning; Ohio State University; 1960; page 4.
2. Rowe, A. P.; "If The Gown Fits"; Melbourne University Press, 1960.
3. Marshall, Max S.; "Power Politics"; College and University; Winter 1962.

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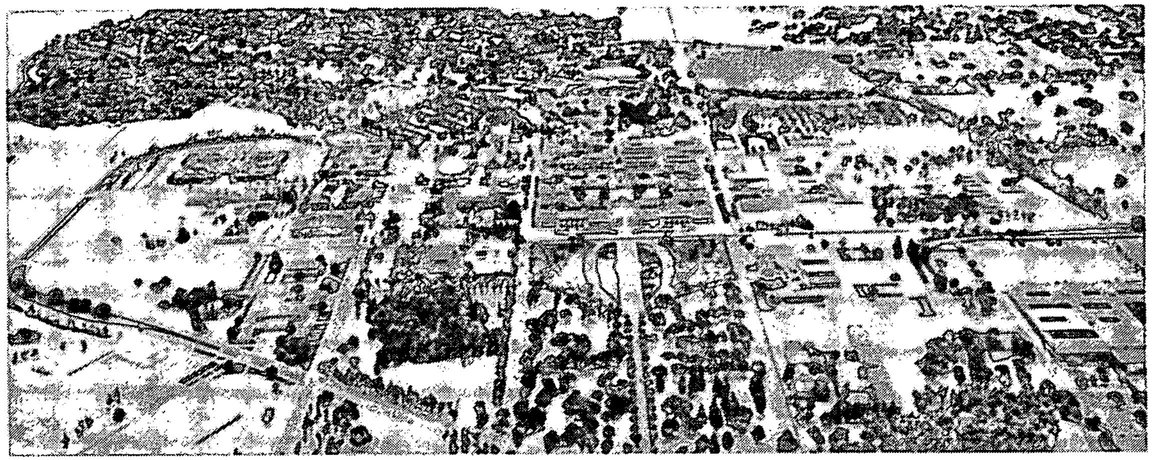
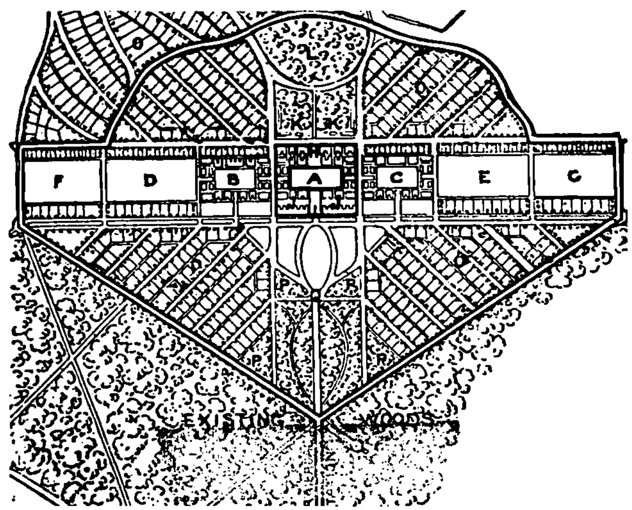


3A



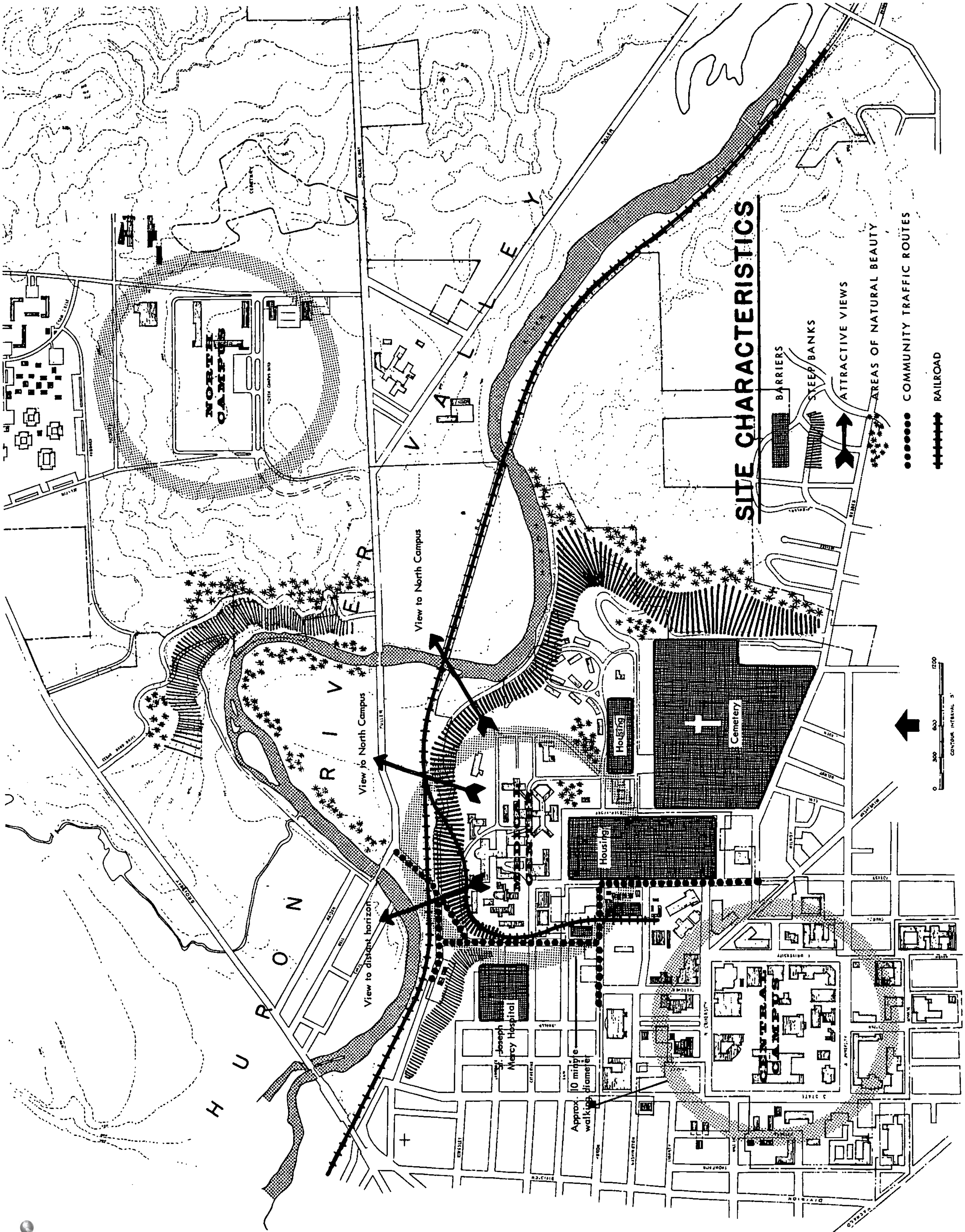
3B

3A, B
The Planning Enterprise

In determining the purpose of planning full consideration must be given to such things as the size of the enterprise, the complexity of institutional decision making, the matter of renewal of the old parts and the staging of the new, the creation of images to gain widespread understanding and support. All these are vital parts of the planning process.

A three dimensional statement of the process is seen in the study model that is guiding the development of the Stanford University campus. The usefulness of the planning process is evident by comparing the early plan prepared by the Olmsteds (about a half century ago) and the recent edition of the plan. The skillful arrangement of circulation elements, topography and central campus features has served well over the years.

PHOTOS: STANFORD PLANNING OFFICE


SITE CHARACTERISTICS
BARRIERS
STEEP BANKS
ATTRACTIVE VIEWS
AREAS OF NATURAL BEAUTY
COMMUNITY TRAFFIC ROUTES
RAILROAD
NORTH CAMPUS
CENTRAL CAMPUS
HURON RIVER VALLEY
View to North Campus
View to North Campus
View to distant horizon
Housing
Housing
Cemetery
St. Joseph Mercy Hospital
Approx. 10 minute walking diameter

3. Survey and Analysis of Existing Conditions

PURPOSE

Chances are slight that a solution to campus expansion will spring totally from insight, intuition and inspiration. These qualities may be present and happily at work, but in most instances considerable preliminary groundwork must be done to gather and evaluate all the data necessary to the development of an appropriate plan. This is done in the survey stage, and is an important phase of campus planning. Surveys and analyses are carried on in a concrete way for the purpose of:

1. Knowing how land, buildings, and other physical elements on campus and in the environs are used.
2. Discovering deficiencies in the existing physical plant.
3. Identifying conditions which must be overcome or respected in planning any new development.

In the survey phase the constituent physical elements of the campus and environs are described and evaluated. Survey materials can be categorized as inventory or analytical, i.e., objective accountings of existing conditions or subjective interpretations of factors and relationships disclosed in the inventory process.

The Base Map

The base map is a major tool in the survey stage. It is the instrument for communicating site information. It should contain at least the following:

1. The environs surrounding the campus expressed as land uses and streets.
2. Boundaries of the institution's land holdings.
3. Roads and major walks on campus, and points of entrance.
4. Campus buildings in block outline form.
5. Main entrances to buildings.
6. Buildings by name, function, number of floors, gross square footages, building materials, building condition, date of construction and dates of major renovations, if any. For legibility and ease in comparison, this information may be shown in the map legend and keyed to the buildings.

1
Summary of site characteristics
From: University of Michigan Medical Center Plan
Prepared by Johnson, Johnson and Roy

7. Functional outdoor spaces such as playfields, parking areas, and others. Label or use a legend key for listing acreage, use, capacities, and related information.

8. Topography using five foot contour intervals (see comments below on topographic information).

9. Major vegetation, outcrops of ledge, wet lands, and other site conditions.

10. Location of major existing utilities.

The base map may be used for presentation drawings, for buildings and grounds operations, as an illustration of the campus grounds in the college catalog, or as a map for visitors and students. Its essential reason for being, however, is to serve as a working document from which sketch plans can be made and planning carried on, and it should be especially designed with this in mind. Draw base maps so that inexpensive black and white copies can be made from them.

The ozalid process is one workable technique. In this process the original drawing is photographically transferred to a plastic master from which multiple copies can be printed. The master can be easily corrected and additional information added. The original drawing and a reproducible copy of any major changes in the master print should be filed away for use in the event the master print, from which copies are being made, is damaged.

The scale and sheet size of the base map will depend on the acreage covered. Use the largest scale possible for a single sheet. Avoid scales with odd footages such as one inch: one hundred twenty-five feet, or one inch: eighty-three feet. For planning purposes the best scales are one inch equals 40, 50, 80, 100 or 200 feet. The lower end of the range is preferable because building heights and topography can best be shown.

When the base map area cannot be accommodated on a single sheet, then make an index map and divide the campus into separate planning areas. Draw these areas at the same scales so that individual maps can easily be pasted together for comparison, continuity, or presentation.

In breaking the larger area into smaller ones, it is better to have the area of prime importance (e.g., central campus) on one sheet of odd rectangular dimensions, than to spread the central area over several sheets merely to have all sheets of uniform dimensions.

The following are typical sources for survey data:

1. *Topographic information*

For areas east of the Mississippi River: U.S. Geological Survey, Washington, D.C.

For areas west of the Mississippi River: U.S. Geological Survey, Federal Center, Denver, Colorado.

For terrain studies of large areas, flight navigation maps (available at most airports) and army map service surveys (Corps of Engineers, U.S. Army, Washington, D.C.) are inexpensive and useful documents.

2. *Surface geologic conditions*

Though coverage is sporadic, large sections of the United States have been surveyed by the U.S. Geological Survey. Check with local agent for special studies of areas not covered in the standard survey.

3. *Soils*

Best source of information is the local agent—U.S. Department of Agriculture, Soil Conservation Service. This office is expanding its scope of work to include soil mapping service and interpretation for urban land uses.

4. *Aerial photos*

Most of the United States has been covered by the U. S. Department of Agriculture, Commodity Stabilization Service. Commercial firms such as the Fairchild Aerial Surveys, Inc., also have stock photos available for inexpensive reproduction. The science of air photography and photometric interpretation has improved. Topographic base maps of large areas can be produced at a price that competes favorably with ground survey methods.

5. *Other sources*

The following sources should also be canvassed for survey material; sometimes the material can be used "as is," or easily adapted to base maps.

1. City, regional and state planning agencies
2. Utility companies
3. Fire insurance atlases
4. Regional and state departments of public works
5. Regional and state highway departments
6. Local development commissions
7. Libraries
8. Colleges and universities having geography and geology departments
9. Departments of Natural Resources (state level)

The Topographic Survey

Project plans and many development plans cannot be made without topographic information. In current practice the client is responsible for providing the consultant with a topographic survey. Where budgets are tight, or a full-scale planning effort has not been initiated, a crude but useful topography may be constructed from building and utility elevations or by photographically enlarging United States geodetic survey sheets, and extrapolating intervening contour lines. If it seems likely that the institution will remain on its site, then the investment in an accurate and complete site survey is warranted. The specifications for such a survey are shown in illustration 2.

If the entire site cannot be surveyed at one time, then areas which are liable to undergo early construction should be surveyed. Partial surveys should be carefully planned so that later ones will correspond in scale and information. Survey maps should be treated as base maps and drawn so that continuing corrections and additions may be made.

Field Studies

With the base map and the topographic survey completed analytical field studies can begin. The following are typical areas which should be explored in a deliberate way.

1. *Site and environmental data*

The land should be examined for those natural conditions which encourage or restrain development. An analysis of soil types, ground water, the location of ledge and steep slopes will help determine economical building areas. Note natural hazards such as flood plain zones, earthquake zones, and other dangerous site conditions.

The designer's palette can be enriched by identifying specimen trees and plants that might later be incorporated in the campus design. The overall topographical form and natural features should be scanned on the site with reference to their potential usefulness in reinforcing or adding to the design. Field studies in which these elements are systematically explored are useful in that they help planner and designer become acquainted with the site, and they begin to set in motion the act of design by giving first impressions. For example, streams, ponds, and other bodies of water first seen as natural occurrence may later be used as buffers between land uses, as athletic and recreational areas, or as reflection pools for large-scale architecture.

A review of climate is useful. Prevailing winds, temperature changes, insolation, humidity and precipitation establish general conditions which affect such things as the design and orientation of buildings, and the use of outdoor spaces. Decisions on simple matters — such as the location of pedestrian paths, for example—are affected by regional conditions. A comfortable walking distance in Florida may not be so comfortable in Minnesota. While a winding path may be easily traversed in arid districts, areas with heavy snows and ice formations require a different set of design standards.

Clinically, variety in climate stimulates the physiological processes, but excesses in warm or cold conditions reduce the human capacity to resist infection and disease. What is desirable, then, is a reasonable variation in climate and some control of both outdoor and indoor conditions. By studying the microclimate, such things as the direction of wind flow and the effects of solar radiation can be manipulated to soften harsh weather effects and stabilize microclimate within ranges tolerable to man. This may be done by the use of plant materials, the artificially shaping of earth forms, and by siting man-made structures. Each of these measures affords the opportunity for a richer design expression, thus manipulating functional needs towards aesthetic ends.

Noise as an environmental factor. With the trend towards central campuses and higher densities, noise control will become more important in college and university development.

The science of acoustics has advanced to the point where sources of noise can be measured and steps taken to control its nuisance factor. Using a microphone, sound level meter and filters, noise levels at particular locations can be computed and compared to the standards suitable for the area under study. In general the following noise levels should not be exceeded:

1.	Urban college near traffic arteries	35 decibels
2.	Urban college with a belt of protective landscape	30 decibels
3.	Suburban college	30 decibels
4.	Rural college	25 decibels

These levels apply to noise sources having a smooth spectrum in frequency (without strong single notes) and in time (without beats or impulsive transients). Sporadic sounds can generally be ignored

Noise comes from equipment which is located in the school, from machines and vehicles outside the school property, and from persons whose speech or activities are most audible.

In-plant noise sources include ventilating fans (low frequency noise) and air diffusers (high frequency sound), machines in shops and laboratories, elevators, and intercom systems. The students themselves make noise during various activities such as athletics, manual arts, typing, music, and simply talking. Footsteps create audible impact which is easily transmitted to quiet areas through concrete floors and sometimes through the intermediate elements of the building structure.

Noise sources outside the school buildings include vehicular traffic (automobiles and trucks with defective or inadequate mufflers and motorcycles are the most disturbing), auto horns, airplanes, winds, and construction activities.

The noise level from a given source, perceived at a certain location, can be reduced by: (1) increasing the distance between the source and the listener—in the open, sound intensity is reduced by one half for every doubling of distance, due to the spreading of sound in all directions (2) placing sound absorptive material around or near the source—the source is most effectively throttled by placing the material as close as possible to the source itself; and (3) interposing a complete or partial solid barrier between the source and the listener.

At high frequencies, including those frequencies at which the ear is most sensitive to noise, sound waves behave like light waves. Solid barriers of earth, masonry, or even wood, will cast acoustic shadows, thereby reducing the noise level in the shadow region to a certain extent. Densely planted trees and shrubbery will reduce the noise level of sources on the ground, but only if the vegetation is quite dense.

Noise control measures inside buildings include absorptive treatment of surfaces near the sound sources, construction of walls of high transmission loss, and properly planned location of mechanical equipment rooms and ducts. Rooms requiring maximum quiet levels should be located away from sources of noise inside and outside the building. New products for noise control are being developed to match the acoustic difficulties em-

Table 17.
Specifications for a Topographic Survey

The surveyor shall prepare maps of the given area showing all the information herein specified. The maps shall be as follows:

1. Topographic map at scale of 1″ = 50′.
   a. Inked on mylar or tracing cloth.
   b. At scale of one (1) inch equals fifty (50) feet.
   c. With contour intervals of two (2) feet.
   d. These map(s) may be done in sections after consultation with the site planners.
2. Topographic map at scale of 1″ = 100′.
   a. Inked on mylar or tracing cloth.
   b. At scale of one (1) inch equals one hundred (100) feet.
   c. With contour intervals of 10 feet.

ACCURACY REQUIRED:

1. Vertical: ninety (90) percent of the contours shall be within one-half (1/2) the contour interval. Spot elevations shall be within one-tenth (1/10) foot.
2. Horizontal: all clearly defined planimetric features shall be within one-fortieth (1/40) inch of their correct position.

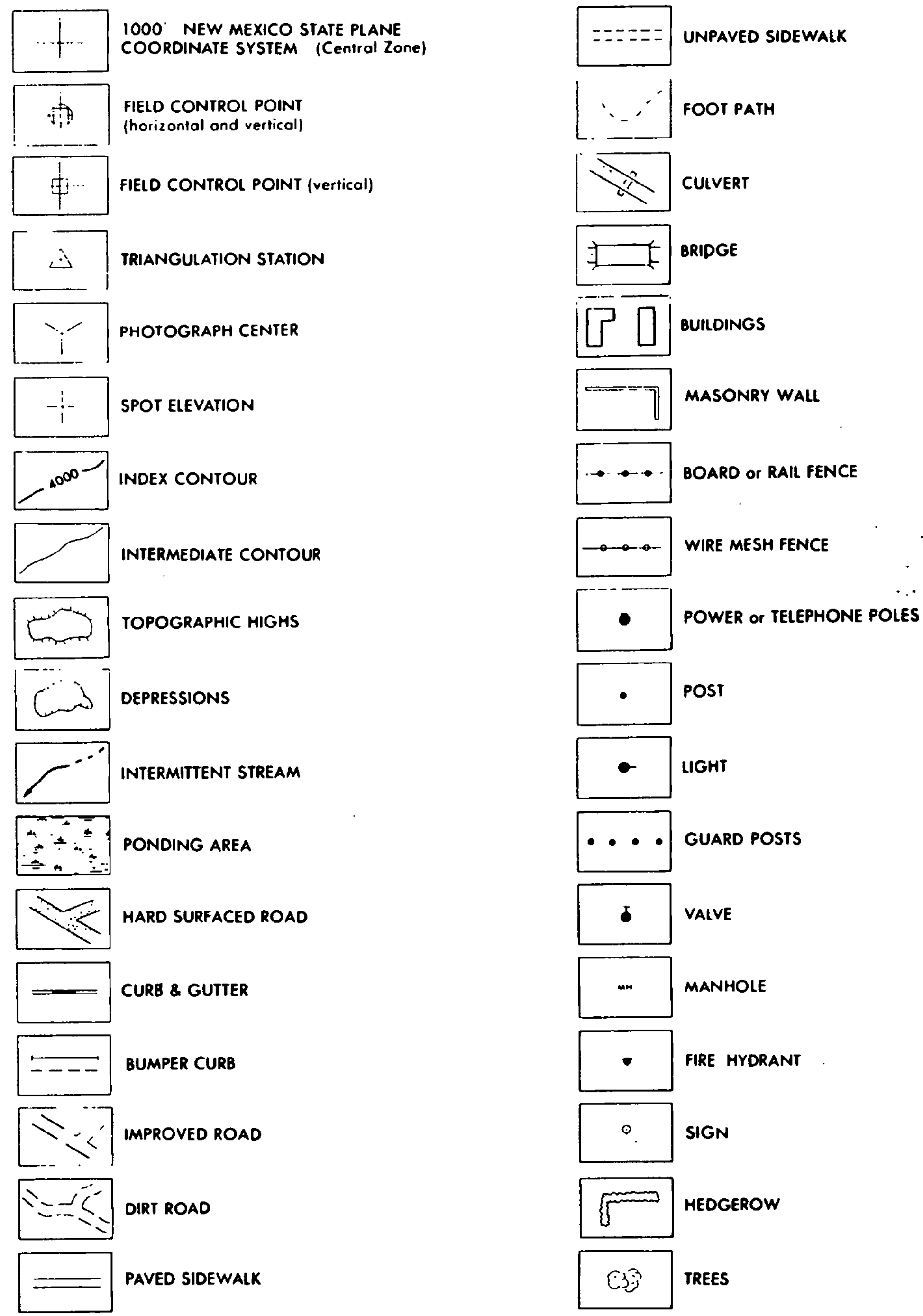
DATUM:

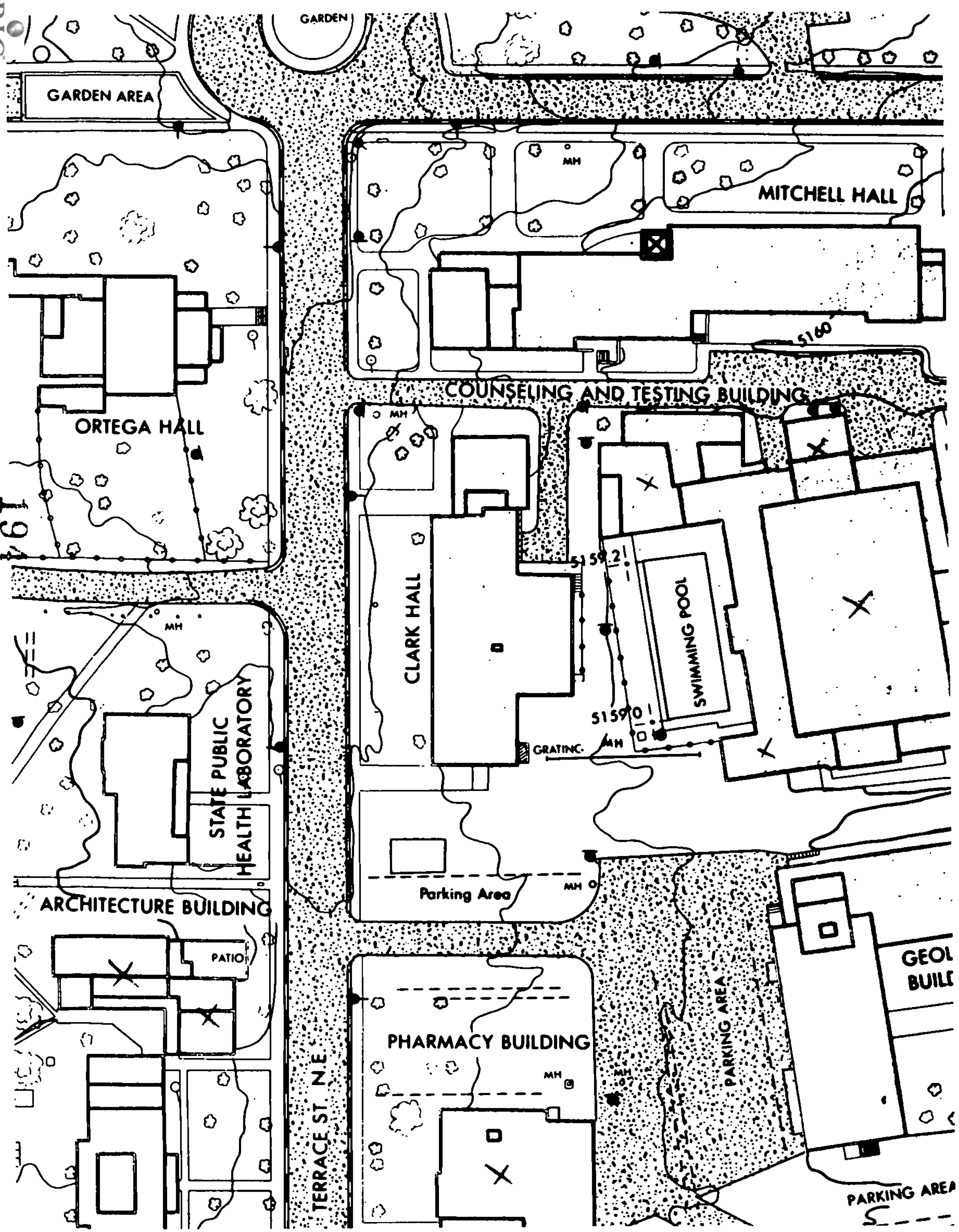
1. Establish a base line and five hundred (500) foot grid reference system with not less than six (6) monuments set in the field within the map boundaries. Location of monuments shall be decided by conference with the site planners.
2. Elevations shall be referenced to mean sea level.

INFORMATION REQUIRED ON THE MAP:

1. Title of survey, property location, scale, north point (true and magnetic), bench mark datum, direction of prevailing wind, certification and date.
2. Tract boundary lines, courses and distances.
3. Building lines, easements, and rights-of-way.
4. Names and locations of existing streets and rights-of-way on or abutting the tract. Show type and width of street surfacing.

LEGEND





2

Section of site survey prepared for comprehensive planning and project execution at the University of New Mexico.

Courtesy of: Eckbo, Dean and Williams, Landscape Architects

phasized by today's lightweight construction techniques. Fiberglass, foamed glass, lead, metal-plastic laminates, resilient clips and hangers are a few of the materials that help the architect gain acoustical control of the campus environment. Setting aside areas for noisy activities and the zoning of compatible and incompatible uses, as well as using exterior landscape for acoustical controls, can make the campus a more effective instrument for education.

2. *Conditions survey*

Survey all buildings, structures, and functional outdoor spaces. Identify size, condition and use. Assess each element as to structural and mechanical adequacy, identifying violations of safety and other code standards. Make preliminary judgments as to which buildings are likely to be rehabilitated, modernized or altered. Identify which buildings probably have short term usefulness. Determinations of long term usefulness can be made on the basis of cost of maintenance, functional obsolescence and physical condition. If possible, determine replacement costs, as this factor alone will sometimes affect planning decisions. The conditions survey may be combined with a space utilization study, since the data uncovered is common and pertinent to both studies.

3. *Space utilization studies and functional area study.*

These studies measure the efficiency of operation of various campus facilities for the purposes which have been assigned to them. The advantages of a space utilization study are:

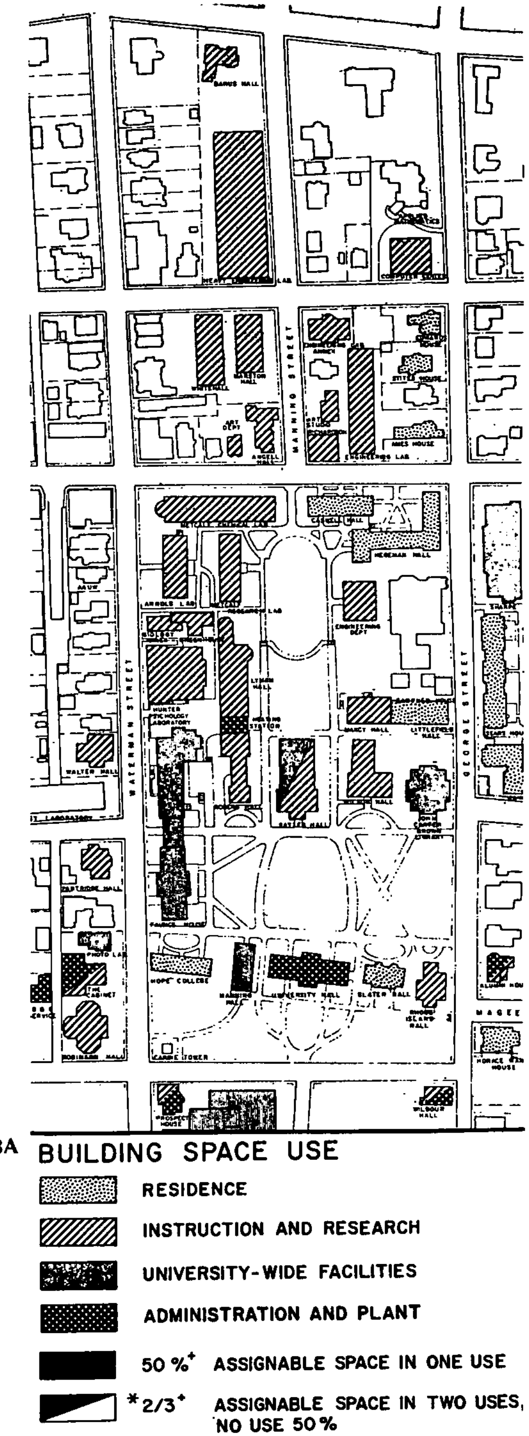
1. By locating facilities not fully used, some expansion needs can be met without new construction, by making simple renovations of the existing plant, or by making adjustments in their uses.
2. Facilities at capacity or close to capacity can be identified, and proper measures taken for relief.
3. Existing operation standards are disclosed, such as the amount of square footage occupied by each student in each subject area.

Several techniques for making space utilization studies are listed in the bibliography at the end of Chapter 2, Section II (Instructional Facilities). Space utilization studies and conditions surveys lend themselves to automatic machine data processing, which is an economical way of maintaining a perpetual inventory of campus facilities.

To help understand how the campus is being used after the space utilization study has been completed, prepare diagrams showing the functional arrangement of existing campus land uses and special buildings. Locate elements such as:

a. academic area
b. housing area
c. library
d. student union
e. administration building

Typical diagrams are shown in this section. As a guide to picking out use areas, also see planning indices listed in Section II.



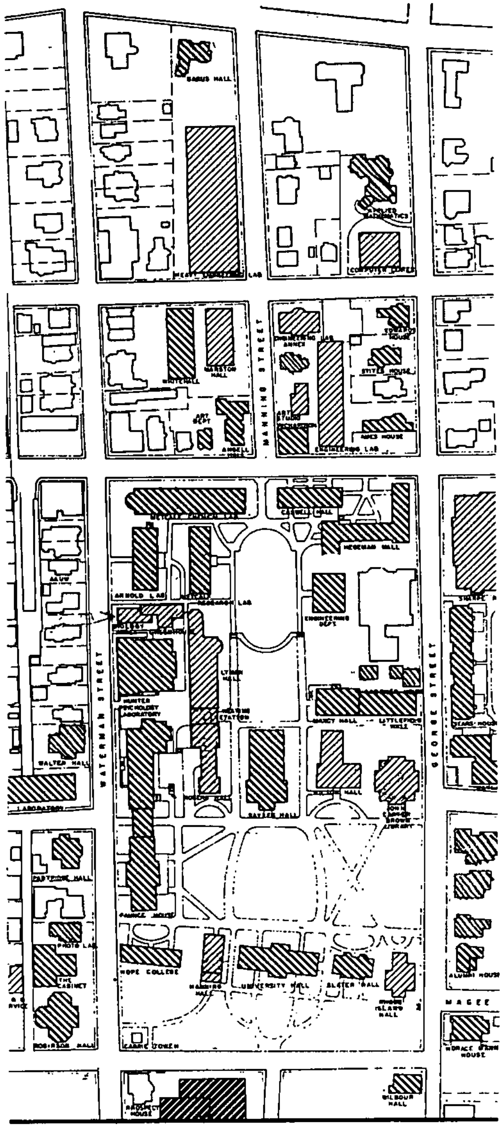
3A

3A, B, C, D

Brown University Master Plan Studies

Excerpts from site analysis studies.

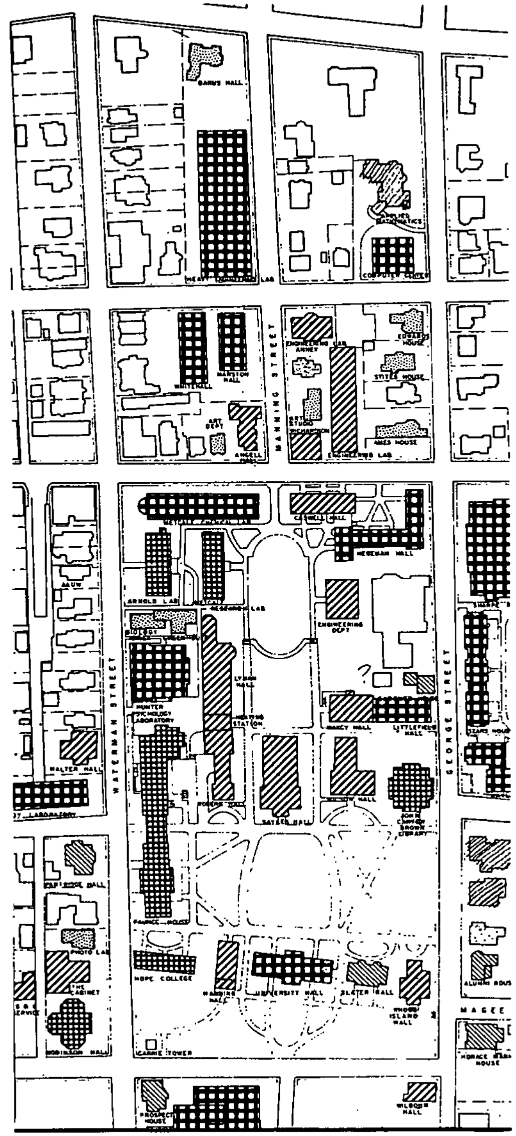
Prepared by Sasaki, Walker & Associates, Inc.



3B

BUILDING HEIGHT

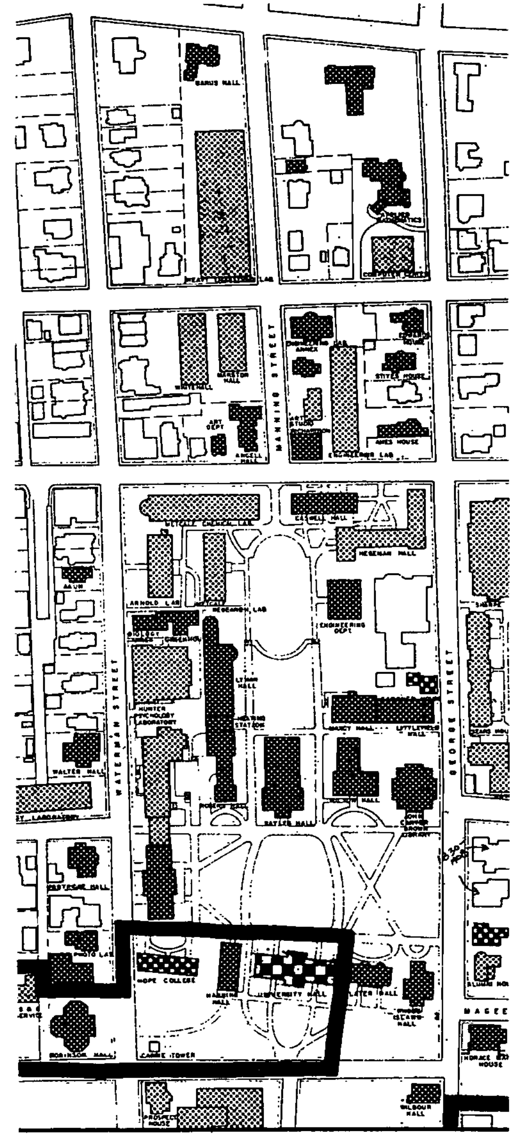
- 1-2 STORIES
- 3-4 STORIES
- 5 OR MORE STORIES



3C

BUILDING CONSTRUCTION TYPE

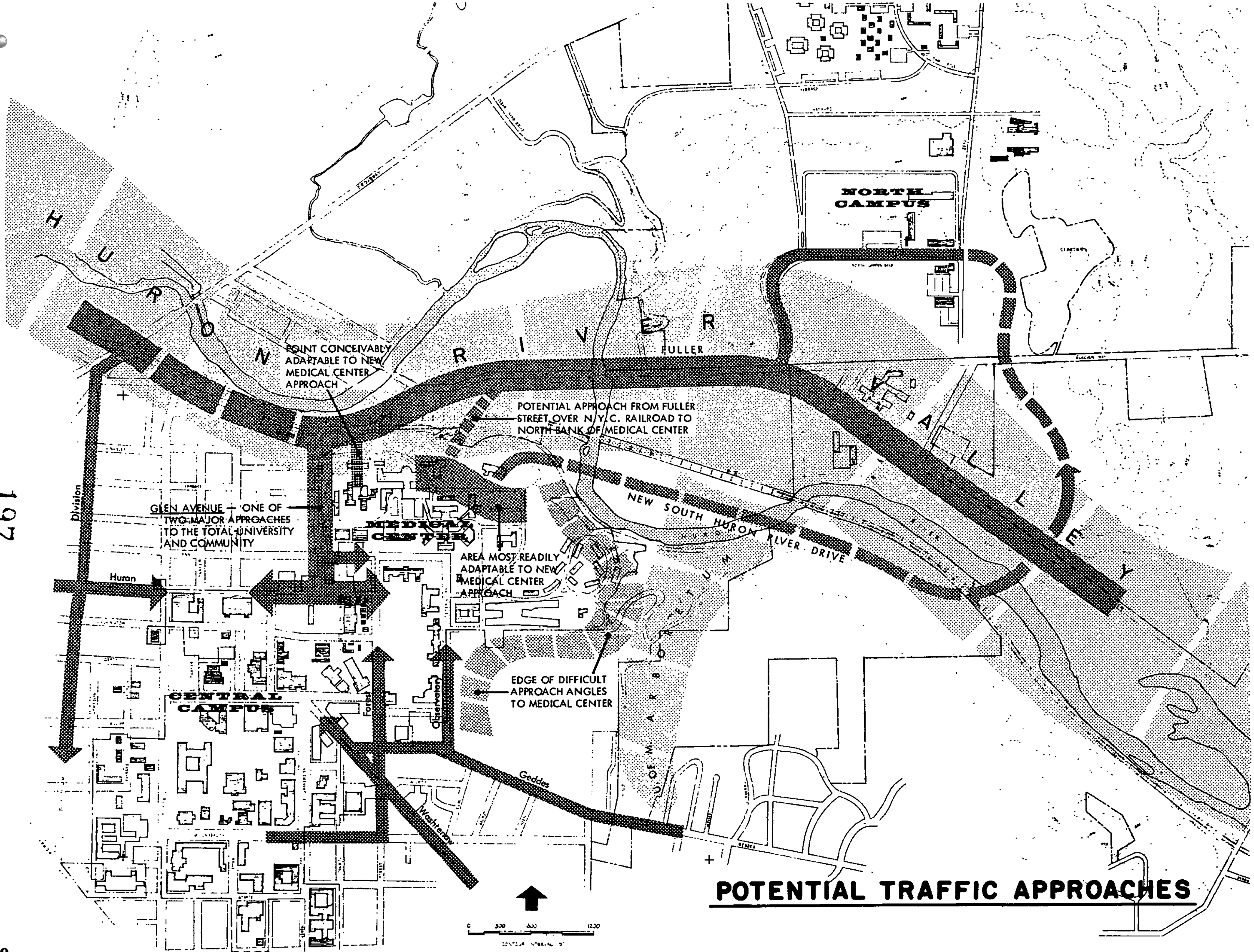
- WOOD FRAME
- WOOD FRAME, BRICK VENEER
- MASONRY WALLS, WOOD CONSTRUCTION
- MASONRY WALLS, STEEL CONSTRUCTION
- REINFORCED CONCRETE



3D

BUILDING AGE

PRE-REVOLUTION	before 1775
COLONIAL AND FEDERAL	1775-1830
GREEK REVIVAL AND VICTORIAN	1830-1908
20 th CENTURY	1908-
HISTORIC ZONE BOUNDARY	


POTENTIAL TRAFFIC APPROACHES
NORTH CAMPUS
HURON RIVER VALLEY
FULLER
POINT CONCEIVABLY ADAPTABLE TO NEW MEDICAL CENTER APPROACH
POTENTIAL APPROACH FROM FULLER STREET OVER N.Y.C. RAILROAD TO NORTH BANK OF MEDICAL CENTER
NEW SOUTH HURON RIVER DRIVE
GLEN AVENUE — ONE OF TWO MAJOR APPROACHES TO THE TOTAL UNIVERSITY AND COMMUNITY
MEDICAL CENTER
AREA MOST READILY ADAPTABLE TO NEW MEDICAL CENTER APPROACH
Division
Huron
CENTRAL CAMPUS
Forest
Observatory
EDGE OF DIFFICULT APPROACH ANGLES TO MEDICAL CENTER
U OF M ARBORETUM
Geddes
Washtenaw

[Th]e parts of the campus circulation system have already been described in Chapter 2. In the survey and analysis stage, identify the existing channels of flow. Study the campus to determine how people and vehicles enter and leave. Identify the terminal areas of the circulation system on campus, such as

a. entrances and exits of all buildings
b. service docks and loading platforms
c. parking areas

Evaluate whether there is adequate access at these points, and whether the capacity of the terminal areas is sufficient to serve the flow of people and goods. Examine the transition areas between channels of flow to determine whether they are safe and properly located. Search for impediments to this, such as dead-end paths, lack of sidewalks along roads used by both pedestrians and vehicles. Other common obstacles which should be noted are:

a. mixture of traffic types
b. road and path capacities insufficient for intended use
c. intersection problems
d. inadequate signalization

Identify areas where planting, signals, signs, lighting, or bridges, would improve the function, safety or appearance of the channels of flow. For example, would a pedestrian bridge at the intersection of major path and campus road be safer, more convenient, and allow better flow than a grade crossing?

At the appropriate point in the planning period:

a. diagram desired linkages between various parts of the campus, both existing and proposed;
b. identify (preliminary) the location and kinds of flow channels that may appropriately serve the linkages;
c. tentatively locate transition areas and terminal points for future program requirements;
d. check feasibility on basis of cost, staging and site design potential. Make revisions accordingly.

With this information in hand, the final planning will:

a. remedy deficiencies in the existing circulation system;
b. incorporate revised existing system and new requirements into an overall hypothetical circulation network;
c. make final adjustments of the hypothetical requirements on the basis of cost, staging and project design programs for the first improvements.

Parking surveys are helpful in determining theoretical capacity of existing parking facilities, as well as in identifying remedial programs to increase the safety or efficiency of their use. Theoretical capacity is the total number of legal parking spaces available on campus. Utilization ratios are calculated by dividing theoretical capacity by actual number of cars parked during a peak period.

When surveying parking conditions note:

1. Type of parking space: curb, lot, garage, other.
2. Legal versus illegal parkers.
3. Type of parker: student, visitor, staff, or other.
4. Type of vehicle: auto, truck, other.
5. Turnover in use of spaces.

Make analytic surveys of parking conditions on peak days. Determine peak days from the registrar's class schedule. Monday, Wednesday and Friday tend to be days of heaviest demand, since the three day instructional schedule fits into this pattern. Tuesday and Thursday parking demands are likely to be smaller, as students and faculty avoid Saturday classes whenever they have a choice in the matter. A parking study of the Kenwood campus, University of Wisconsin, also indicated a correlation between peak classroom hours and parking demand. More parking spaces were available in the late afternoon than in the morning.

Many institutions have strong controls on campus parking. Each student and staff is required to register his car. Spaces are assigned in order of priority (usually seniority). Window stickers are applied to all cars as a means of identification. This makes it fairly easy to survey parking conditions as well as to enforce regulations. A sampling of license plate numbers can be taken where the sticker system is not in use.

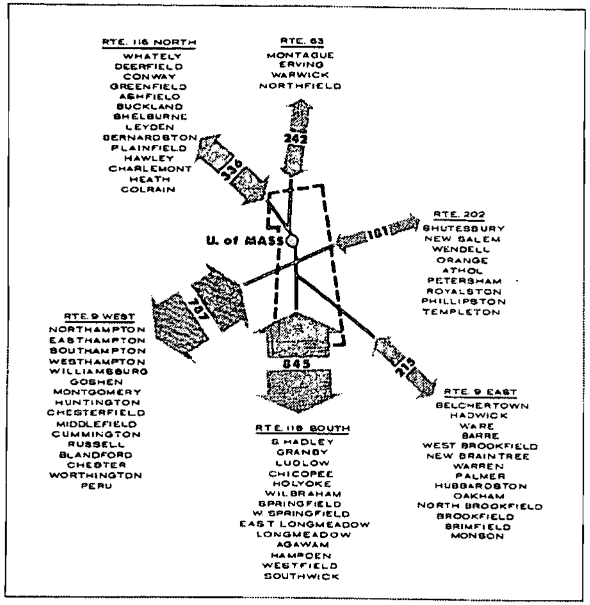
By correlating existing use with the program for parking, the number of spaces and facility types required can be summarized. Those parking improvements which are susceptible to administrative control, can be identified. "Parkers show selectivity in terms of convenience to direction of arrival and walking distance," a study by John Adelberg for Brown University disclosed. Parking lots near the main campus and main streets tend to be used to capacity and above, while lots further removed are less used. Sometimes administrative enforcement of existing parking regulations is all that is needed to serve current campus needs.

In the survey also make note of awkward layouts and poor internal circulation in the parking lots, cracked or abraded surfaces, illegible stall markings, poor lighting and fencing, inadequate control signs, absence of landscaping. Note whether or not pedestrian paths from lots to campus are safe and convenient. Check whether entrances and exits to these areas can be improved. Correction of any substandard conditions will help increase the efficiency of existing parking areas and proportionately reduce the need for new construction.

4

Summary of physical obstacles and potential traffic approaches to the Medical Center area.

From: University of Michigan Medical Center Plan
Prepared by: Johnson, Johnson and Roy



TOTAL COMMUTING VEHICLE TRIPS FACULTY, STAFF AND STUDENTS-1962 — FIGURE 3

COMPREHENSIVE CIRCULATION STUDY — I

336 DAILY COMMUTING TRIPS

UNIVERSITY OF MASSACHUSETTS PLANNING COÖRDINATION N

SASAKI, WALKER & ASSOCIATES, INC - WATERTOWN 72, MASSACHUSETTS - AUGUST 1962

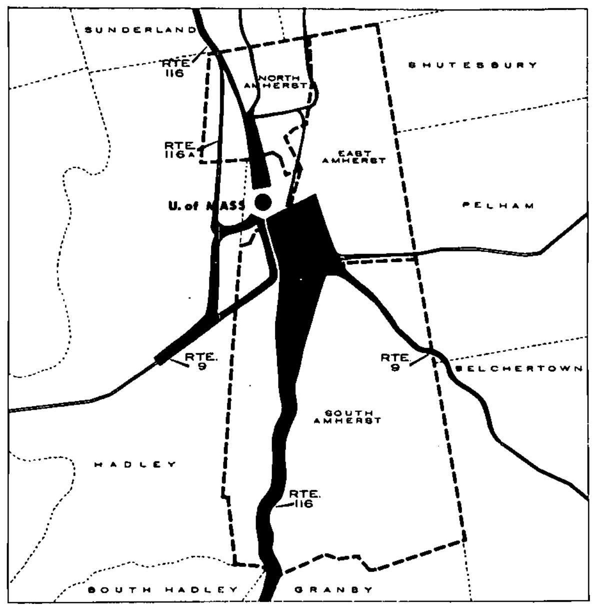
5A

5A, B

In determining the logical main entrances to the campus, probable best locations for convenient parking, and the overall arrangement of the circulation system, it is useful to study the origin and destination of daily commuting trips taken by faculty, staff and students.

These can be mapped and diagrammed for future use and comparison, such as these two summary maps.

From: Planning Co-ordination Report
University of Massachusetts
Prepared by: Sasaki, Walker & Associates, Inc.



DAILY VEHICULAR VOLUME OF ALL CAMPUS TRIPS IN 1962 GENERATED BY FACULTY, STAFF & COMMUTING STUDENTS · COMPREHENSIVE CIRCULATION STUDY - I — FIGURE 4

1000 2000 3000 4000 VEHICLES PER DAY — BOUNDARY OF AMHERST SUBAREAS

UNIVERSITY OF MASSACHUSETTS PLANNING COÖRDINATION N 0 1 2 3 4 5 10 MILES

SASAKI, WALKER & ASSOCIATES, INC. - WATERTOWN 72, MASSACHUSETTS - AUGUST 1962

5B

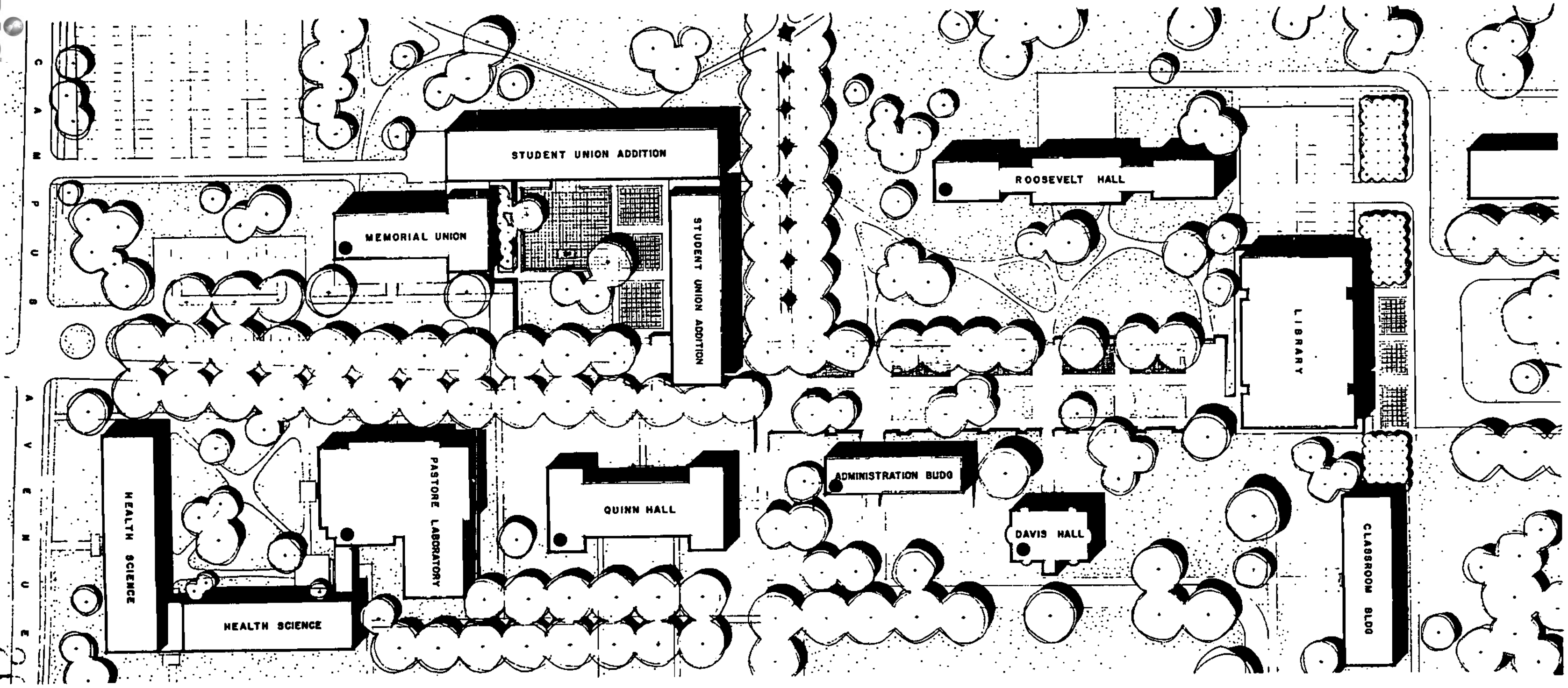
5. *Utilities*

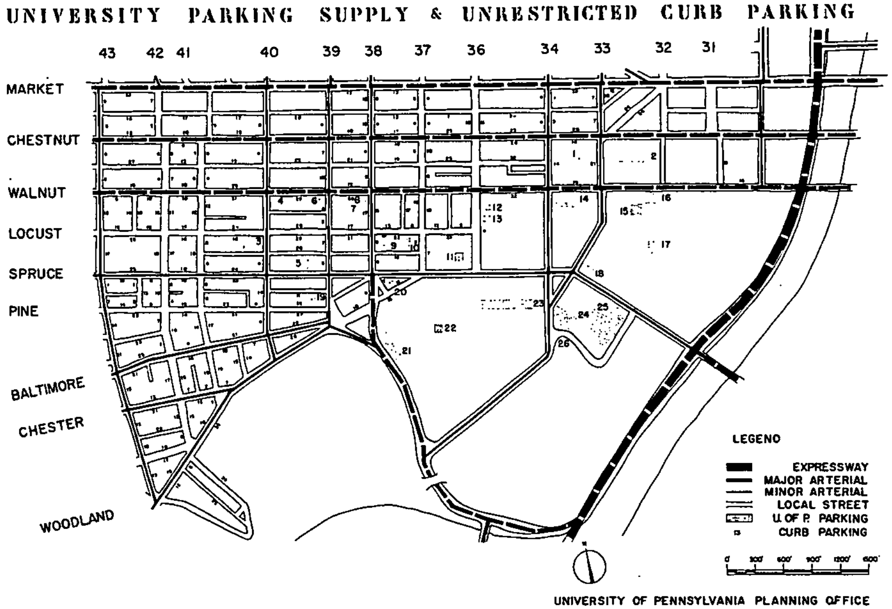
No institution can operate well without adequate utilities, such as sanitary and storm sewer systems, water, electricity, gas, telephone, security alarm systems, heating and ventilating systems. Map existing utilities and identify by use, size, and general condition. The location of existing facilities will be a potent factor in siting new ones. How well existing utilities work, their potential capacities, and what new utilities are required are technical matters requiring engineering judgment. For planning purposes, a general assessment can be made in collaboration with those responsible for buildings and grounds and plant operation on campus. If such information is lacking, or special problems arise, or there are obvious differences of opinion among those being questioned, objective, competent, technical advice should be sought immediately.

6. *Visual design survey*

All of the studies suggested so far have design implications, either because of functional considerations or because they introduce factors that can be manipulated to help establish an overall design form for the campus. The visual survey may be thought of as a further enlargement of the designer's palette. It has the important purpose of uncovering those things which make each institution distinctive, and each site a special place.

The physical contents of the campus are the instruments of continuity and the physical embodiment of tradition and culture. Observe the places where people naturally congregate. Campus crossroads, special open spaces, memorial gates, fences, plaques, statues, clocks, towers, groves of trees, fountains, pools, ponds—all these enrich the design fabric that already exists and should be carefully traced and woven into the future design. All existing vistas and views should be identified in the visual survey. Note also the potential for exposing fresh ones. Architectural styles may create campus controversies. But "with the exception of love, there is perhaps nothing else by which people of all kinds are more united than by the pleasure of a good view." (Sir Kenneth Clark in "*Landscape into Art.*")





6

University of Rhode Island Core Area Plan
Existing buildings (black dots), landscape, major pedestrian walkways (to the right of student union building), and campus landmarks were organized into a core area by closing the existing street (between student union and administration building).

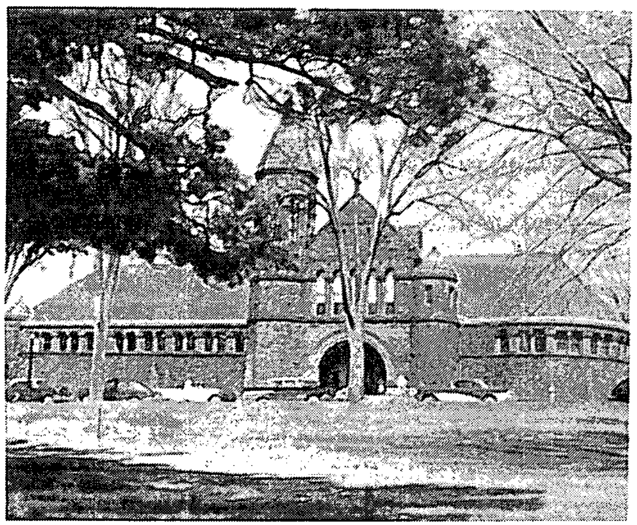
The new library was placed at the end of the resulting mall, creating a vista to the north.

From: University of Rhode Island Development Plan
Prepared by: Sasaki, Walker & Associates, Inc. (1960)

7

Survey of off-street and curb parking
prepared for University of Pennsylvania long-range development plan.

Courtesy: University of Pennsylvania Planning Office



8
University of Vermont Student Center
This historically important building, designed by H. H. Richardson as a library, is being renovated into a student center.
PHOTO COURTESY OF UNIVERSITY OF VERMONT NEWS SERVICE

7. *Historic buildings and sites survey*
Campuses show a history of constant change — demolitions, replacement, the decanting process. Except for some residential buildings, there are few structures on campus, built before World War II, which continue to serve the purpose for which they were originally designed. Engineering buildings have been changed to art studios, libraries to eating halls, unions to administration buildings. The change was not noticed because the pace was slow. The tempo has now increased.

Buildings having historic significance deserve special treatment. A goodly number are now scheduled for destruction on campus. This seems highly contradictory to the educational institution's basic purpose, since colleges and universities, serving as instruments for conveying our common heritage, are dedicated to the preservation of the best of the past.

There may be as many as three thousand buildings on American campuses that meet the criteria for evaluating historic sites and buildings as established by The National Trust for Historic Preservation. The three thousand figure is based on approximate number of structures built before 1900 and in existence at the time of the College and University Facilities Survey conducted in 1957 by the Division of Higher Education, Department of Health, Education and Welfare. There are probably sites and buildings developed after 1900, which also merit preservation.

Some campus buildings of historic and cultural significance, cannot be preserved because they are structurally inadequate. Cost of continuing maintenance is often prohibitive. Such buildings were erected by journeyman carpenters from inadequate plans, and with shortcomings forced on the builders because the institution did not have enough money to pay for the best materials. That such buildings have remained in use so long indicates not only the affection in which they are held, but also the penury which has postponed their replacement.

Much of the impending destruction will occur on central campus, since typically the institution grows in tree-like fashion from the center, and the center is the area which is likely to be oldest. Whether or not all such destruction is necessary can be questioned from the viewpoint of long-range development strategy. Campus buildings, not in danger of falling down, are being pulled down because mostly another use has been identified as being appropriate to the location involved. The singular use of the single site can be challenged.

There are few commitments in perpetuity possible in campus planning. Thorough scanning will disclose a number of reasonable uses to which any historic building can be put, once the function it now shelters has to be moved. For example, faculty offices, seminar rooms and study halls are three kinds of space in constant demand — such space needs lend themselves to easy renovations. Student organizations, short term research projects not requiring technical laboratories, departments temporarily displaced while awaiting new quarters—all these uses can be satisfied in older buildings. And would it not be an interesting experiment to return some of the older structures to their original use as residential facilities, if no other assignment could be made? Where the old building must be integrated into a new complex, there are few limits to architectural invention in connecting older structures to new buildings. Where actual joining is impossible, landscape design can meld old and new.

"Not all buildings subject to the normal process of campus growth are worthy of preservation. What is required is the reduction of the number of indefensible and needless instances of destruction. No useful purpose is served by destroying our architectural heritage, and of all places, a college or university has the obligation to retain the best of the past. As works of art, as symbols, as manifestations of culture, many campus buildings and sites belong to that category of things which comprise the heart of the academic tradition."[1]

To integrate these signs of the past with the best of the new is a legitimate design goal in planning future development.

Proper care in selecting buildings for demolition and replacement can be observed by evaluating existing buildings on the basis of:

a. *Historical and cultural significance*
   1. Broad historical value
   2. Identification with historic personnage
   3. Identification with historic event
   4. Architectural or landscape value as a work of art

b. *Suitability*
   1. Representing a reasonable amount of original material
   2. Adaptable to functional uses
   3. Reasonable costs in restoration, reconstruction and renovation
   4. Reasonable continuing maintenance.

The above remarks also apply to structures outside the central campus. The problems of preservation are not so much conflicts in site use; rather they are ignorance as to historic values, or administrative impediments to the projection of alternate uses for a building in which an existing function cannot be continued.

Some words of emphasis on the campus landscape are again in order. Open spaces are particularly susceptible to destruction. The eye should search out memorial groves and special campus landmarks, views and vistas that are relevant to the traditions of the institution. These should be preserved. As to abandoned campuses—the orphans of inevitable change—the causes and cures are complicated to the extent that no general remarks will suffice. The decision to move a campus is made with great reluctance. Once made, there is an inertia towards turning back. Campuses are moved largely because their environs failed to support a climate compatible to the institution's purpose. The cause of historic preservation is best served by supporting those community-wide measures which fight urban blight and decay.

8. *Town and Gown Studies.* Campus and environs are connected by webs of mutual interest. Parking and circulation problems neither begin nor end at the campus gateway. The adequacy of the community environment for the two thirds of the institution's population who live off campus is important. The design of the campus is visibly affected by the context of its site. The institution must abide by zoning, community planning and building codes. It is continually subjected to development problems such as land use changes, and the inevitable process of urban growth and decay. Even in Cambridge, Mass., the oldest institutional neighborhood in the United States, this fact has not yet been fully realized.

"One of the reasons both the City and University have been somewhat slow in solving their problems is their reluctance to accept their urban status. This is understandable on both sides. Harvard thinks of itself as a residential college, much more like Princeton and Dartmouth than Columbia and Chicago. It is understandable, but it just isn't so. Harvard University is an urban university, sitting right in the middle of a busy metropolis. On the other hand, many Cambridge citizens do not think of Cambridge as a city. For them it is much more like Princeton or Williamstown than it is like New Haven or Morningside Heights. This is understandable, but it just isn't so. Cambridge is a functional part of Metropolitan Boston, not a suburb. Its problems of traffic control, land use, and juvenile delinquency are urban problems, not suburban."[2]

A study of colleges and universities showed that a representative cross-section of half the respondents were located in an urban situation which made it difficult or impossible to acquire more land.

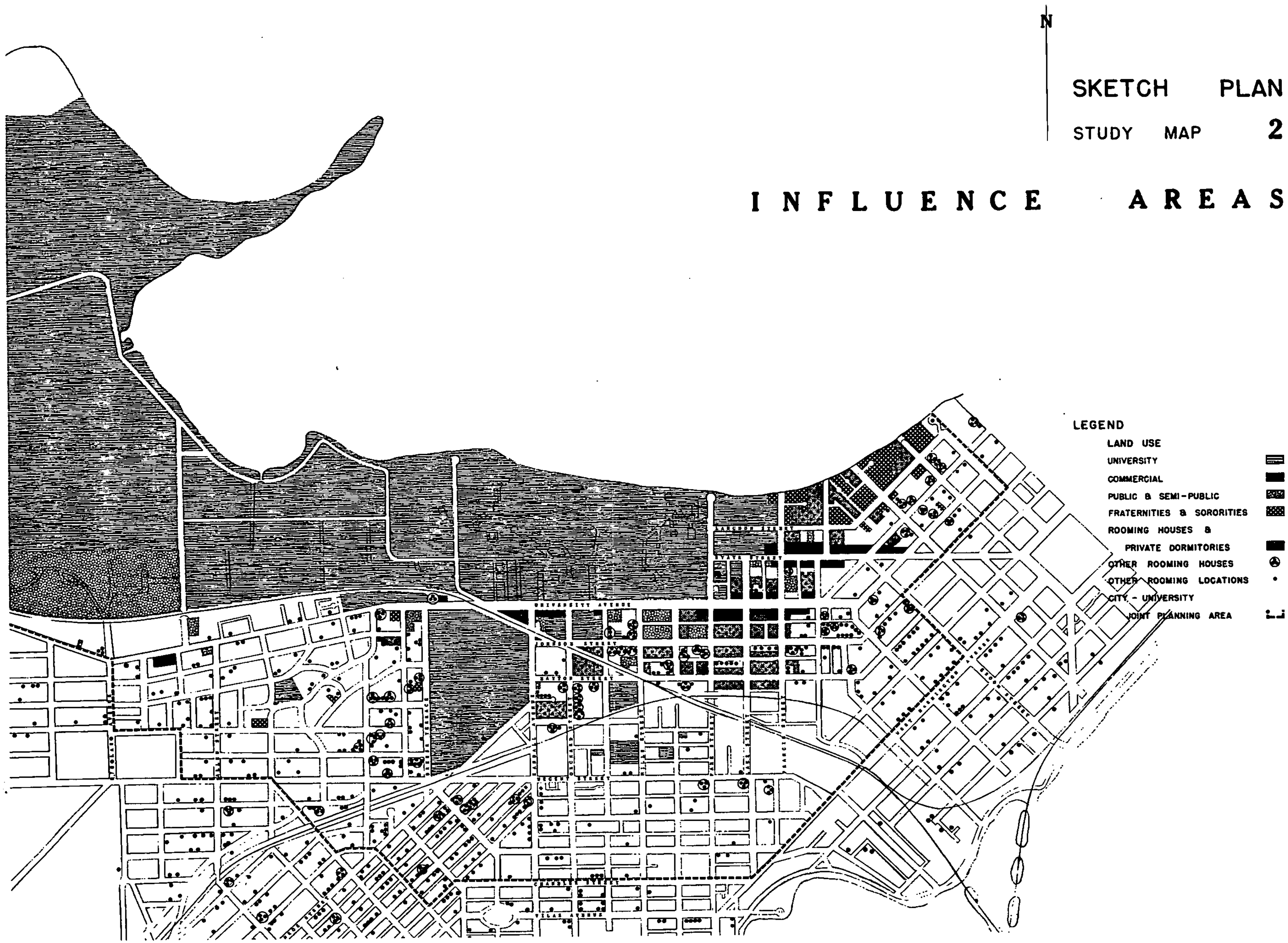
There are a growing number of instances in which the institution may have a legitimate interest at cross purposes with the articulated needs of its environmental community. The institution and the community may have to compromise on the varying points of interest. In this instance, the institution's point of view is defensible only if it understands the community's position, and the community can hardly judge the institution's position if the campus requirements are not made known.

The foundation for compromise is a continuing exchange of information and a liaison between technicians and professionals responsible for community and campus planning.

If for no other reason than self-interest, the institution should keep track of use, value, and changing patterns of activity on the land in its environs. These barometers and indices are basic to long-range planning. The following list is a sample of materials that should be gathered and assessed in the planning period, with reference to their relationship to campus development:

a. community and regional land use, circulation and transportation plans
b. community development plans, including urban renewal and capital improvements
c. matters relating to campus environs
   1) land holdings and land uses
   2) assessed valuations
   3) conditions of structures
   4) market value of land and structures
   5) legal codes on land
d. identification of areas where people associated with the institution work, shop and live. These areas comprise the institution's "spheres of influence."

What constitutes the campus environs is a matter of professional planning judgment. The determination of the "spheres of influence" is part of the planning analysis.



9

Through land use and activity location studies, the institution's zone of influence can be mapped and diagrammed – as shown in the study above, prepared by the University of Wisconsin Planning Office.

ing survey materials and analytical data

:spite a uniform base map and a systematic procedure, a seemingly chaotic proliferation of materials will take place during any good survey. The accumulation will take the form of notes, diagrams, sketches, air views, photo inventories, block models, special reports and many memos. There will be incomplete information, overlapping information, partial assessments. Characteristic of the design and planning process, the scales of maps will begin to differ, the quality of drawings vary, the writing become obscure. All this is to be expected since the materials gathered are working documents, reminders, check points, ideas—the raw data which has yet to be sifted and organized into meaningful summaries.

There are three dangers in the survey stage: not collecting enough data; not knowing when to stop collecting data; and not knowing how to organize and communicate the essential accumulated information. There are no general rules for the first two points. No one can tell in advance which of the materials will be of the greatest importance, though experienced professionals may make a good guess. Often the original impetus for planning is symptomatic of a larger problem. Human nature, campus politics and campus history, rather than deficiencies in physical plant, may give rise to a need for emphasizing some items more than others. A systematic procedure such as the one outlined in this chapter will disclose the significant and strategic data on most campuses.

The problem of organizing survey data is essentially one of deciding what should be communicated to lay people who haven't the time for absorbing technical details. During the planning period, a number of meetings will be held with such different groups as the alumni fund raisers, the board of regents, the faculty senate, and the working committees on campus planning. Except for the quibblers and the specialists (who can be briefed in detail separately) a synthesis of the major facts is all that is needed. As syntheses, they will be referred to time and again, and an investment in a series of permanent documents is warranted. Summaries should be in keeping with the size of the enterprise. An elaborate presentation for a modest survey may be embarrassing, as well as an unwise use of the budget. On the other hand, where there are complicated problems, controversial issues, and extended planning, it is best not to have one's "arrows too lightly timbered for so strong a wind."

A minimum set of reference documents in the form of maps and charts will include:

1. *Base map* — described earlier.
2. *Site analysis map* — a summary of relevant site characteristics such as the major pedestrian and vehicular routes; barriers to development, such as steep slopes and ledge; areas of natural beauty.
3. *Campus diagram* — description of how the campus is organized operationally. For example, a summary of campus land uses and their interpositional relationship.
4. *Problem map* — a graphic summary of physical development problems.
5. *Statistical summaries* — such as a chart listing data on the number of buildings, their use, condition and other related information.

Off Campus Data

At least the following summaries should also be included:

6. *Environmental conditions* — those factors in the environs which affect the use and operation of the campus:
   a. existing land uses
   b. nature of traffic flow, circulation, parking, transportation
   c. assessed land values
   d. zoning
   e. community facilities
   f. special landmarks or uses associated with the institution
7. *Site availability study*—This is a strategic and confidential document which explores alternatives for growth on land not owned by the institution. In those cases where the institution can feel secure in obtaining land without being subjected to inflated prices and holdouts, the preliminary plan may be designated as a "land acquisition" plan.

Communicaton

If planning is to be a continuing activity the following set of tools will also be useful:

a. topographic model of the campus with scaled block models of existing and proposed buildings

b. enlargements in data and survey materials on special parts of the campus

c. pertinent technical reports on special problems uncovered in the survey and analysis. For example: evaluation of utilities; parking and circulation plan; resumé of enrollment trends; evaluation of food operations; other studies.

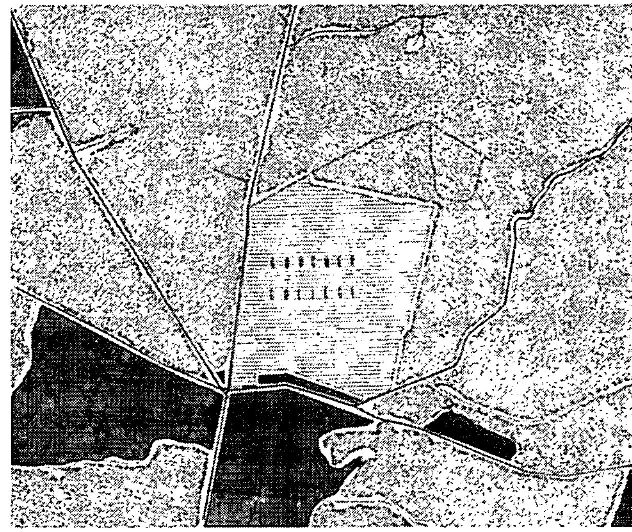
All such materials are benchmarks which will be referred to time and again. If the budget permits, they should be prepared in a fashion that allows corrections and further information to be added, such as in the form of overlays. Sometimes it is helpful to reproduce basic information on Kodachrome slides, which are more portable than full-size display boards.

Several institutions have found it useful to build their block models in many small sections. Each section can be revised independently of the other sections. When a smaller portion of the campus is being reviewed, it is easy to transport just those sections relating to the areas being studied. The total model is more portable since it can be broken down and moved in a station wagon. Such models should be of a good planning scale and made with permanent materials, such as wood. Cardboard models, while cheaper than wood, tend to warp and come apart over a period of time.

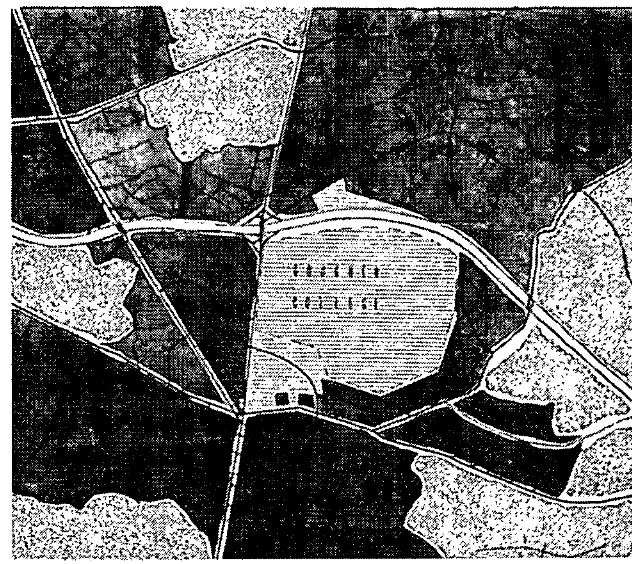
Survey and analysis studies are costly, and budgets for tooling-up may seem reasonable only in the light of planning as a continuing activity. It takes time to collect and assess materials. If the studies are to be more than a superficial obeisance to proper planning, professional and technical judgments are necessary during the data gathering period. Which survey and analytic materials are important to the planning effort should be decided during the work program period, as described in Chapter 2 of this section. This chapter has outlined what the author considers minimum requirements for a development plan. Adjustments in the data may be in accordance with the results expected from planning.

10
The essential planning problems can be graphically summarized
10A
Goucher College and the land uses in the environs, circa 1938.
10B
The resulting changes during the post-war period. The college, which had moved from downtown Baltimore to the green fields of Towson, Maryland, found that the city had followed. A major task in the long-range plan was to restore the original amenities. Among the measures taken was the establishment of a green buffer around the periphery of the campus.

From: The Goucher College Development Plan
Prepared by: Sasaki, Walker & Associates, Inc. (1958)



10A



10B

FOOTNOTES

1. Dober, Richard P.; "The Three Thousand Decisions"; Historic Preservation; Volume 14; Number 4; 1962.

2. Whitlock, Charles P.; "Two Men In A Boat—Some Special Problems Of An Urban University"; *Harvard Alumni Bulletin*; April, 1959.

4. Programming the Development Plan

PROGRAMMING THE DEVELOPMENT PLAN

Programs have been described previously as policy and criteria — a set of directions for making the plan. Programs for the development plan focus on estimating physical plant requirements for some point in the future. It may be a moment in time such as *The 1975 Plan*, or a projected enrollment such as *3,000 F.T.E. Plan*. Whether it be the initial measurement of the planning task or the final summation that accompanies the plan, a program may be considered adequate if it includes these considerations:

1. *Educational policies*. A summation of educational goals and objectives, called the academic plan.
2. *Projections*. Here, two kinds of information are needed—demographic and physical plant. Demographic projections include a description of campus population—i.e., the number and characteristics of students, faculty, staff and other personnel expected to be accommodated by the development plan. Physical plant projections indicate the probable physical plant requirements for the projected population.
3. *Planning and design criteria*. The standards, fixed conditions, or requirements that must be met in the development plan. The various program and planning indices listed in Section II are typical.
4. *Planning policies*. These are the general guidelines for development which are not so easily expressed as mathematical formulae or in statistical summaries. Also included in this portion of programming are matters such as target dates, desired positional arrangements of campus land uses; policy positions on special matters uncovered in the survey and analysis stage; and statements regarding any other issues on which the institution wishes to take a clear position.
5. *Improvement schedule*. A priority listing of specific physical improvements. In the final program document, the schedule might be accompanied by a brief description of each suggested change or addition to the campus, the costs involved, and perhaps an illustration of the improvement, itself.

PROGRAMMING EDUCATIONAL POLICIES

The educational goals of an institution can be summarized with as much precision as might be expected in a situation where a firm provision must be made for anticipated change, yet allowances built in to meet unknown contingencies. The key to differentiating between aspiration, ambition and actuality lies in structuring a series of self-validating assumptions.

The first set of these assumptions, which is generally called the academic plan, defines the general educational objectives and describes the conditions which may impede or stimulate the attainment of educational goals. The second set indicates the ways in which educational programs are organized administratively — the curriculum. The third set of assumptions outlines major considerations for facilities peripheral to curriculum, but nonetheless critical in designing an environment for learning, such as the influence of housing in the educational program.

General Conditions Affecting the Academic Plan

Accomplishment of general goals will be affected by forces and conditions that can be identified but not measured. To the extent that they control implementation of the plan, or set *à priori* conditions that must be met, they should be included in the text of the program. Many factors will affect the entire institution; others will have selective effects on individual departments.

Typical of the general conditions affecting program and plan are the factors picked out by Dr. Tom L. Popejoy, President of the University of New Mexico, in formulating a statement about the future development of the Albuquerque campus. Dr. Popejoy's descriptions have been slightly paraphrased so they are relevant to all public systems of higher education, as well as to many private institutions.

1. The shortage of highly qualified faculty will accelerate the growth of those disciplines which can use new techniques and media in instruction and thereby increase the reach of the individual professor.
2. If the college-age population and enrollments rise faster than earned income and much more rapidly than the taxable income of the state, there will be increasing pressure to raise faculty-student ratios, extend the school year, maximize the physical plant. Budget and educational considerations may lead to the consolidation or abandonment of marginal curriculum in order to accommodate new instructional programs and strengthen existing ones.
3. If State junior colleges expand, the total enrollment at the public university level within the state will not be affected, but there will be a significant shift from lower division to upper division curriculum and a corresponding rise in space per student enrolled.
4. Because the major role of a state university in all maturing state educational systems is graduate education, that enrollment will grow more rapidly than undergraduate enrollment.
5. The causative factors of a state's growth will give rise to needs and opportunities for exploiting regionally based emphases in curriculum formation.

SOME EXAMPLES OF EDUCATIONAL GOALS EXPRESSED IN THE ACADEMIC PLAN

The academic plan is important because it can convey prime distinctions, account for speculative thought, and indicate the impact of both real and possible conditions on physical planning.

The distinctive characteristics of any institution can be determined by examining its past accomplishments and by indicating where the institution now stands in the spectrum of higher education. An important item is clarification of the program's future goals, and these cannot easily be disassociated from past accomplishments. In this continuum, a description of the ways in which the institution under study differs from other institutions, is as important as are its similarities with comparable schools.

History confirms the significance of variety, diversity and decentralization in American higher education. Dissimilitude arose from the American ethos in response to changing cultural contexts. From time to time each generation valued higher education for different reasons. And whenever the existing institution could not adapt itself to the demands of the moment, a new institution was founded. "As a consequence," notes Nevitt Sanford in "The American College," "virtually every objective that could reasonably be conceived of is somewhere represented."

Though phrased in general terms, the academic plan starts the percolation of ideas and ideals which become the essence of the physical plan. Here are some examples of how educational goals can be expressed (generalities, to be sure, but nonetheless strong reminders about what must be done). Each goal is unique to the institution for which the academic prospectus was prepared.

"A major requirement for a truly great comprehensive university is that its many departments reinforce and stimulate one another. Therefore, we have placed great emphasis upon a unified campus — a campus so closely knit that people will think and speak in terms of 'the campus' and not of the 'west campus' or the 'east campus.'...We have tried within the unified campus to create effective groupings of related disciplines, without regard to existing college or other administrative lines. . . . Another requirement for academic efficiency is that each department or other agency have an adequate amount of suitable space. This we have provided to the extent specified by the Office of Campus Planning. We believe that the plan has ample flexibility to adjust to any reasonable changes in the future."
("CAMPUS PLANNING STUDY FOR THE OHIO STATE UNIVERSITY, PHASE II—THE RECOMMENDED PLAN," 1961.)

"No program leading to advanced degrees will be retained."
("UPTOWN CAMPUS PLAN"—DE PAUL UNIVERSITY, 1961.)

"Due in large part to the institution of the electives program with its resultant complex scheduling, it was found necessary to discontinue the traditional marching to classes by the midshipmen. The results have been very satisfactory. In many cases this practice has eliminated the need for midshipmen to return to Bancroft Hall from the Academic group during study periods in mid-morning or mid-afternoon. If sufficient additional study spaces were made available in the Academic area many more midshipmen could conserve valuable time. Planning for new facilities should include a provision for more study spaces."
("FUTURE DEVELOPMENT OF ACADEMIC FACILITIES FOR THE UNITED STATES NAVAL ACADEMY," 1961.)

"We hope that the architects will think not conventionally but symbolically and functionally. Since spiritual reality is neither visible nor material, symbolic thinking is by its very nature flexible, creative, and free. We should like the physical appearance of the college to reflect strongly the distinctively Christian character of the institution architecturally just as its curriculum reflects it educationally. . . . (The plan) should both symbolize and promote the element of community which will be fundamental to every aspect of the college's life. Whether this Christian symbolism be achieved by building the college around a center . . . or by placing the Chapel at the apex of a v-shaped campus, is not important so long as some adequately symbolic concept is used as a guide."
(PLANNING REPORT, CONSOLIDATED PRESBYTERIAN COLLEGE, LAURINBURG, N. C.)

"U.C.L.A. must be understood as an urban university, living and growing in the tradition of the great continental universities such as Paris, Bologna and Berlin. This is in direct contrast to certain other great American institutions which sprang from the Oxford-Cambridge tradition of quiet, rural isolation and primarily resident student bodies. UCLA is an integral part of what is becoming one of the great population centers of the world, and it is inevitable that the relations between campus and city will be mutually influential. . . . As one of the largest and fastest growing metropolitan complexes in the world, this community is unsurpassed as a laboratory for a complete range of urban studies. This presents an opportunity and an obligation to develop a high competence in this field."
("ACADEMIC PLAN FOR THE UNIVERSITY OF CALIFORNIA," LOS ANGELES, UCLA, 1962.)

SOCIAL PHENOMENA AS FACTORS IN THE ACADEMIC PLAN

There is another area of general qualification which is just emerging from new contributions to the theoretical knowledge of campuses and higher education. Recent work by social scientists is yielding clues as to qualitative differences between institutions. The import of the relationship between physical forms and social phenomena has exciting applications for design. One example will suffice: Martin Trow's study of student cultures, sponsored by the Center for the Study of Higher Education, University of California, Berkeley.

Four types of student sub-cultures have been identified on campus by Trow and his colleagues. These sub-cultures are groups of people who share a common pattern of behavior and attitudes. Group one reflects the pursuit of leisure and pleasure; the movie-like world of football, dating and fun. Group two includes vocationally oriented students who value education for its job opportunities and social mobility. Group three concerns itself with intellectual tasks and strives to widen the opportunities for learning on campus. Group four is non-conformist in habit and appearances, similarly motivated as group three by intellectualism, but seeking satisfaction in the wider circles of politics, art and adult society outside the campus.

Many institutions embrace all four groups; some campuses lean heavily in one direction. Various combinations of the groups will occur in the same place over a period of time. These descriptions are stereotypes. Implications can be drawn that each of these groups places different demands on curriculum and on the physical facilities, particularly the architecture of housing, libraries, recreation and common buildings. Through the location of facilities various kinds of social goals may be met. Through scaling (establishing the texture and density) the overall design form of the campus can also reflect this aspect of the program.

Such considerations are not as speculative as they would first appear. Their connection with educational goals lies in the creation of a focused sense of identity. The framers of an academic plan at a large Pacific Coast university felt this identity was important for the attainment of the ultimate goals, urging that institutions like Harvard, Yale, Princeton, Stanford and Berkeley, by virtue of age and visibility, have acquired a family-loyalty cohesiveness which in no small measure helps their climb to true academic greatness.

Special identities, and the resulting physical form, are of great importance to all schools, particularly to private institutions. The expected increase in public education enrollments will be the outstanding factor affecting the educational goals of private institutions. Private institutions will grow in proportion to: (a) the increase in funds made available to them for campus development through public agencies or legislatures; (b) the proficiency of the individual institution in attracting resources from private philanthropy; and (c) the ability which it has in creating a special educational advantage, which by law or tradition cannot be provided by public institutions. The relationship which that uniqueness has to programming, planning and designing facilities is as simple and direct as these contrasting statements:

"A dignified but not luxurious dormitory is needed for about three hundred men. This should be a comfortable residence hall, but not so "modern" as to compete with the basically ascetic experience of getting an undergraduate education."
(FROM "A DEVELOPMENT PLAN FOR CANISIUS COLLEGE," 1960.)

". . . allow space for contemplation and for aesthetic pleasure and for play; privacy for thinking and studying; and a pervasive atmosphere which will be at the same time serious and gay, somber and warm; traditional and forward looking, made up of time past, time present, and time future."
(STATEMENT BY SKIDMORE COLLEGE BOARD OF TRUSTEES TO ARCHITECT AND PLANNERS OF NEW COLLEGE'S CAMPUS, 1961.)

Considerations of Curriculum in Relationship To The Development Plan

In his article "The Curriculum, Don't Leave it to the Faculty"[1] Dr. Francis H. Horn gives three meanings to curriculum:

a. The total academic program
b. Specific course content of a program for a specific degree
c. Content of a particular course

Curriculum formulation does not usually fall within the purview of the campus planner and designer. It is the task of a specialist which can be handled in several ways, and by several groups:

a. Special Advisory Committee
b. Educational Consultants
c. Curriculum established by administrative fiat

1. *Special advisory* committee. Under this system, representatives of the institution sit as a group to review matters of curriculum as they relate to the development plan.

". . . the subcommittee was assigned the following tasks: to familiarize itself with the history and traditions of the (institution); to gain some understanding of the institution's present strengths, weaknesses, and resources; to study and recommend on the basis of the above, the directions in which the institution should move in the next decade."[2]

Committees of this type tend to avoid studies of individual programs and stress overall academic objectives. Frequently, this is because the committee does not feel competent to judge the content of a particular course, but more generally because of a reluctance to encroach on the hallowed grounds of academic freedom—which include the right to teach subject matter in highly individualized ways.

2. *Educational consultants*. Educational consultants may be hired to formulate a specific educational program in order to sharpen the academic prospectus, and to establish a bridge between general curriculum policy and specific operations. The following summary is typical of this approach:

"The outline of spaces proposed herefor the campus is based on the following curricular plan as presented in the report derived from the panel of educators:

a. *There will be two degrees, the Bachelor of Arts and the Bachelor of Music.*

b. *The schedule of the College will be organized on a semester basis, but the year will constitute the primary unit of sequence for courses.*

c. *The educational program will consist of two nearly equal halves:*

1. *the Basic Liberal Studies and a foreign language and*
2. *major elective and professional studies*

d. *The major program will consist of 24 to 30 credits in a major field, including the senior seminar.*

e. *During his four years each student will carry an independent project related to one of the courses he is taking.*

f. *Courses in the Basic Liberal Studies area will be taught by the team method, other courses by the conventional assignment of one teacher to a class.*

g. *The College will be organized into the following departments of instruction: the natural sciences and mathematics, religion and philosophy, education and psychology, the social sciences, the fine arts and visual arts, including the conservatory of music, the language arts, and physical education and crafts."*[3]

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3. *Administrative fiat.* Under this system curriculum organization may be determined by the chief administrative officer. The method is a carry-over from the days when President Philip Lindsey, of the University of Nashville could, with good reason, call his faculty "a parcel of paltry pedants, pedagogues, bigots, charlatans—without feeling, spirit, kindness, honesty or common sense."[4] Today the more charitable defenses for centralized administrative determinations are based on two points: first, curriculum in the largest sense is the responsibility of the chief administrative officer; and, secondly, the faculty does not have the perspective to judge the total picture.

A major criticism brought against all three methods is the lack of participation during the planning period by one or more segments of the institution—faculty, administration, trustees.

In addition, the complexity of institutional growth would indicate a far greater involvement by individuals and groups outside this triad. Academic planning must be particularly sensitive to regional and national requirements caused by drastic shifts in population, enlargement or diminution of resources for supporting higher education, scientific and technological changes.

Perhaps the *academic* planning as well as the *physical* planning could be conducted on a continuing basis. Under such a system the academic planning committees work does not end with a single report and a recommended course of action for the development plan. The committee would continue to sit and review emerging concepts of institutional growth and change. Coordinated physical and educational planning, through the process of *being*, might stimulate a consistent regard for academic and physical planning by serving as the assimilating agency for proposed change, the fact-finding board, and the vehicle for dissemination. As campuses grow larger, (and they show every indication of doing so) perhaps in this manner, size alone will not cause fragmentation of the academic community. It makes little sense to design a cohesive and integrated campus plan, when the operational and educational aspects of the institution are moving in a contrary direction.

Summary

The academic plan should be organized as a formal document for use by the campus planners and as a statement of policy for future development. Include in the document:

1. A description of the major academic divisions and their constituent parts, diagrammed on the base map.
2. A description of existing curriculum.
3. A description of the proposed curriculum, especially as related to what new emphases are likely to take place within existing disciplines, and which proposals are likely to be made for substantially de-emphasizing or eliminating existing efforts. For general planning purposes these facts can be well stated in a few words, as in this concise statement:

"Future plans for the School of Medicine include the expansion of physical facilities and staff related to the increase in size of the medical school classes to 128 students and related increase in graduate programs. Joint teaching and research will be initiated with the School of Dentistry. With completion of the Rehabilitation Unit the para-medical program will be expanded to 50 students."

ESTIMATING FUTURE FACILITY REQUIREMENTS

Though total college and university enrollments are expected at least to double in the next decade, not all institutions will share equally in the rise. Magnitudes of expansion will vary from campus to campus. A private girls junior college may need only a classroom building, music studio and modest increases in dormitory space. A sectarian college may decide to stabilize its enrollment by not building new dormitories, but at the same time to improve the quality of existing facilities by increasing the amount of instruction space and laboratory facilities per student. A state university may be faced with a tripling of enrollments, inadequate construction funds, a relative decrease in the amount of space per student; all of which in turn will force a high utilization of present and new facilities, perhaps even double-shifts.

A determination of future requirements will largely depend upon:

1. The anticipated increase in enrollments;
2. Internal shifts in space standards per person enrolled;
3. Shifts in utilization of existing space.

With the academic program in hand, these steps can be taken to estimate facility requirements:

1. Determine campus population for the development plan's target date.
2. Determine space standards for each activity to be supported on campus (Described in Section II).
3. Determine facility requirements by correlating space standards and estimated campus population.

Estimating enrollments

Enrollment projections can be forecasted, though it is a difficult and hazardous task. A standard work in the field is "Methodology of Enrollment Projections for Colleges and Universities" by Dr. E. J. Lins. His pamphlet outlines several procedures which can be used to good effect if properly understood and carefully applied.

The techniques in current use for projecting enrollments are:

1. *Curve-fitting method*. The functional relationships between previous enrollments are first determined, and then the ratio is projected to the year for which the potential enrollment figure is desired. This assumes that historical trends will be continued.
2. *Ratio method*. This is the most widely used method and has already been commented upon. One can assume there is a relationship between the existing college age population group and the number of people enrolled in college. By using census tables, a general estimated figure can be deduced by analyzing population trends.
3. *Cohort-survival method*. This procedure is based upon the extent to which individuals survive, grade by grade, up the educational ladder. These figures are adjusted regionally and by institutions using historical data. The system may be used in combination with the ratio technique: the latter, for estimating approximately how many students can be expected to enter as freshmen; the former, for estimating drop out and retention survival rates among the students enrolled.
4. *Correlation analysis*. This method is semi-independent of time and is determined by considering one or more variables in association with enrollments through a correlation matrix.

All four techniques are best used by demographers or statisticians rather than general campus planners. Among the qualifications that must also be considered in forecasting are such things as population mobility, birth and death rates within state and region, the results of intensive recruiting of college students by competing institutions, as well as the cataclysmic effects of national military requirements or changes in the economic cycle.

Unique enrollment estimates have been made in compromising circumstances. At one institution, the anticipated income from a fund raising drive was divided by a cost per square foot of construction. The results were related to an overall square footage per student space standard basis to determine the approximate number of new students who could be accommodated. At another school a straight-line doubling of enrollments was assumed and a list of facilities prepared accordingly.

Whether telepathy or teleology is used, some estimate of future population is needed to determine facility requirements. Population estimates should include:

Total population at target date or at target size

- Number of students
- Number of faculty
- Number of administration and staff
- Number of service personnel
- Number of non-institutional personnel on campus

Composition of student body

- Sex
- Marital status
- Academic level

From the basic population data a number of hypotheses as to facility requirements can be made. Programming may be done by hand or may involve elaborate statistical models and high speed computing machines. The more variables that can be accounted for, the more reliable the calculations. Section II lists the nine (9) areas of physical plant requirements comprising the program for a typical development plan.

The program for the final development plan usually is broken down into three categories of information:

a. Facilities that are to continue in use during the period of the development plan.
b. Facilities that are to be significantly altered or removed from campus.
c. New facilities.

The three types of improvements are usually arranged in sequence of probable change and construction.

OGRAMMING CHANGES DURING THE ANNING PERIOD

Programs begin as guidelines for what must be done, but they will be changed and modified as new information is uncovered and as policies shift from what is desired to what is possible. There are four stages in programming.

Stage 1. The initial outline of overall requirements. Ascertain as early as possible the magnitudes of the planning task, including gross square footage of buildings, land requirements, and other improvements. Approximations of ground coverage and building sizes can be made by translating numerical summaries into planning modules and placing these on the survey map or model. A hypothetical sequence of change can be assumed and approximate costs calculated for the physical improvements and construction. Many times this method will suggest the significant alternatives early enough in the planning so that emphasis can be given in the survey and analysis phase to major development problems.

Recently, a large institution opted for a modest increase in enrollment and a shift in curriculum away from undergraduate education to graduate and post doctoral research in the medical sciences. The institution anticipated that these programs could be accommodated by relatively minor additions to existing buildings. The campus was locked into a dense urban area. No campus building was higher than three stories above grade. Advanced academic programs usually require more space per student and per faculty than lower division education, and have, in addition, special land requirements for siting complicated machinery and equipment (particularly radiation safety areas). This general trend was confirmed in the first sketch plan proposal for the school. The institution's original guess as to the amount of space required was actually half of what was needed. The placement of the hypothetical program on the site indicated that either a high-rise solution would be forthcoming, or the institution would have to increase its land holdings. As a result, special attention was given in the survey to the possibility of acquiring contiguous land.

Stage 2. An adjustment of initial program requirements after evaluating survey and analysis material. The matter of replacing obsolete buildings is a good example of this kind of adjustment. Institutions have learned to live with what they possess, especially the private schools on the East Coast and in the Mid-west. Many of their buildings were erected before central heating and lighting were invented. The buildings bear the mark of cluttered floor plans because they were designed for accommodating many uses in one structure—classrooms, living quarters, libraries and common rooms. The cost of maintenance and renovation over a twenty-year period often exceeds the replacement cost of such buildings. Some older buildings are firetraps.

The survey and analysis may disclose that the replacement of "Old Main," while not immediate, is nonetheless inevitable. Since the spectre of poverty often dims perspective as to what should be substituted, the replacement probably was not considered in the original forecast, and the program then has to be augmented accordingly.

On the other hand, space utilization studies which are carried out in the survey phase, may show how the existing plant can be put to better use. The program requirements for future space needs may be lowered. John X. Jamrich, surveying sixty-two midwestern institutions for The Educational Facilities Laboratory, discovered that liberal arts colleges were planning four times as much laboratory space as would be necessary if the existing plant were fully used.

Continuing revisions

With these two adjustments completed, the program data may be collated into a single document to be reviewed and approved before formulating the plan. This does not signal the end of programming. Revisions will continue to be made throughout the planning. By this time, however, those who are doing the planning and those who are reviewing their work will be familiar with the history and traditions of the institution; they will better understand the strengths, weaknesses and resources for planning; and they will be able better to evaluate which problems take precedence, as well as which alternatives to the original program estimates might best be adopted.

Inevitably, program reviews run the risk of becoming mired in the swamps of detail. The program document at the preliminary plan stage should focus first on broad objectives and then on detail. It should be in written form. ('Conceived in writing doth for the most part facilitate dispatch, for though it should be wholly rejected yet that negative is more pregnant of direction than an indefinite."—Francis Bacon) The collation may be several pages long, or a bound volume of statistics, surveys, policy and criteria. Scope is more important than depth, though the greater the substance, the better the plan.

It should be clear that the program is not a static document. A metamorphosis occurs as general objectives and detail are reviewed, especially as proponents on either side of a controversial issue grapple with the realities of compromise in deciding what comes first among several alternatives. As one committee member noted:

"The delineation of the program in an organized and articulate fashion is a difficult task. When . . . stated in a general fashion, it is difficult to avoid the platitudinous. On the other hand when amplification of the general is sought, arguments concerning methods, emphasis and approach stand in the way of agreement. Further, there is some confusion between educational objectives and the alternative means by which an institution may seek to achieve these objectives."

Shifts in the program may be subtle or direct, for as the primary planning problems are resolved, underlying issues which were previous stumbling blocks become exposed. A dramatic example: a consultant was called in to determine the location of a new gym-

nasium, which had been given the first priority in a successful fund-raising campaign. No general administrative agreement could be reached as to where it should be sited. The consultant's study indicated that several choices were available, but each location depended on the manner in which the campus would expand at a later date. Further discussions indicated that the institution had given little thought to what buildings would be required after construction of the gymnasium, though there were sufficient grounds to expect a rise in enrollment whenever the school so desired. Finally, it was agreed that a development program would be organized as a guide for future growth. Cooperation among the various groups on campus was excellent; a sympathetic administration and an intelligent board of trustees shared in the evaluations made by the consultant. The final report recommended a science building and infirmary as having a higher priority than the gymnasium. Additional funds were secured, and the program for construction will follow the new order: science building, infirmary, gymnasium.

An analysis of operations at one institution disclosed a heavy turnover in the lower teaching ranks. The planning survey showed a lack of adequate moderate cost housing in the environs, and in some cases actual exploitation of the housing market. The planning program gave a high priority to "threshold" housing. Two years after the faculty apartments were opened, the president noted in his annual report that the school's ability to contract and hold competent teachers had been measurably improved. This kind of action does not have to await the final planning report.

Costs as a factor in programming

As early as possible estimate the costs of physical expansion. Advance estimates are useful to private institutions which have to start fund-raising campaigns. Public institutions can begin to plan their capital improvements budget. Priorities for expansion are also partially influenced by costs. Modest improvements might be pushed up in the listing because they can be paid for out of current income. An expensive facility may have to be postponed until funds have been acquired.

Once the components of the program for development have been identified the costs of new building construction, the key items for expansion, can be calculated. As a short cut a square footage figure, related to the type of facility being estimated, may be projected on the basis of current prices, plus allowances for rising construction costs, which have increased about 3% a year for the last decade. Bases for projections can be obtained from Office of Higher Education census materials, or by reference to a local project in the same facility category. Projections can also be made by using regional published cost indices, such as the F. W. Dodge construction reports.

Example: Institution Alpha has just completed a general classroom building at $17.50 per square gross foot. The program indicates that 25,000 square feet of additional space will have to be constructed the sixth year of the development program. Regional indices show an average rise in construction costs of 2.7% per year. Estimated cost for facility is: 25,000 square feet x $17.50 square foot x 2.7 x 6.

When the program is sufficiently advanced to account for staging, then a second cost estimate can be made covering the following items which comprise the typical budget for physical plant expansion.

1. New buildings.
2. Remodeling or demolition.
3. Site improvements not apportioned to a building project.
4. Land acquisition.
5. Extension of utilities.

Because firmer estimates of cost are useful, and general decisions about the magnitude of the building program will probably have been made, a more detailed analysis of cost is warranted at this time. There are many methods of estimating costs and professional help in these matters is usually available at modest fees, or as part of consultant services in preparing development plans. No attempt is made here to define any one method, but the following comments indicate the level of consideration that is needed to do an adequate job.

New building costs

These sub-costs comprise the total construction cost of a new building:

1. *Construction:*
   a. general
   b. mechanical
   c. electrical
   d. special
2. *Site improvements:*
   a. Grading and related site development
   b. Roads, walks, exterior walls and related construction
   c. Utility extensions
   d. Lighting
   e. Planting
   f. Parking areas
   g. Outdoor art (fountains, sculpture,)
3. *Professional fees:*
   a. Preliminary planning
   b. Architects and engineers
   c. Special consultants
   d. Surveys, tests, and other
   e. Supervision
4. *Project contingency*
5. *Movable furniture and equipment*
6. *Land acquisition* (where necessary)

Construction can be estimated on a square foot of construction basis, projected ahead to account for rise in costs, similar to the short cut suggested earlier. Basic contract figures should be used, not gross square feet of completed project. Site improvements may be estimated at ten per cent of total construction. Professional fees will vary in accordance with the size of the project, locality, type of professional fee system used and other differentials. State professional groups such as the AIA can provide guides for estimating these fees. Contingency funds may

calculated at 12% of the total construc-n cost.

Equipment costs are an important part of total construction estimates. For 1400 college and university buildings erected in 1960, budgets for equipment and furnishings ranged from six per cent of total construction for agricultural facilities to twenty-four per cent of construction costs for engineering buildings. The annual surveys published in the *American School and University* provide good insights when local figures cannot be obtained.

Where cost is felt to be a critical factor special studies are warranted, for even the above rules of thumb can only be refined guesses. For example 1958 costs for new construction on an assignable square footage per student basis showed these ranges on six California state campuses:

$34 to $60	Science
$29 to $81	Engineering and the Industrial Arts
$25 to $57	Fine Arts
$33 to $46	General Classroom

Remodeling
An important part of the physical expansion will be accomplished by putting older facilities to new use, or simply improving their capacities to serve. Rehabilitation and remodeling generally mean more than ordinary maintenance. The costs of some projects may involve several million dollars of construction, and in other cases require little more than new lighting, minor interior changes and painting. Because they may involve heavier floor loads, special utility requirements and extensive mechanical equipment, science, physical education and libraries are about the only type of space programs that cannot be well accommodated by reconverting older structures.

Generally remodeling will be of three kinds: *Minor rehabilitation* (painting, lighting, floor covering and minor partition and cabinet work); *extensive rehabilitation* (major interior changes, utility work, painting, lighting, etc.); *major renovation* (structural improvements, extensive interior changes, new utilities, painting, lighting, etc.). Costs for each type of rehabilitation will vary considerably, but as a rule of thumb the following square footage indices will serve as a guide in place of estimating actual construction plans.

Minor rehabilitation:	$4.00 square foot
Extensive rehabilitation:	$10.00 square foot
Major renovation:	$15.00 square foot

Demolition costs should be placed in this part of the estimated costs of improvement for campus expansion.

Site improvements
Many site improvements are apportioned to the building budget, since that it is an opportune time to combine site work and building construction. Unfortunately too often the monies allocated for site improvements (especially planting) in the building budget are looked upon as a reserve, to be drawn against when bids come in too high or change orders use up the contingency funds. This is why a new building often fails to look like the architect's rendering. Since there is no mystery as to what it costs to improve the site, nor why such funds are necessary, the original budget for items to be covered by the building contract should be held too.

Most development plans will contain programs for site improvements not related to a specific building. Playfields, roads and walks, parking lots, and general landscape are typical items. Each of these can be priced with good accuracy, once proper review and decision have been made as to the quality of design intended. In the sense that the campus design to a large extent depends on the treatment of outdoor areas and open spaces (either as settings for buildings, as functional areas, or in their own right as amenities) then this aspect of budget-program relationship deserves better consideration today than it has in the past.

Land acquisition
The development plan and program tests what has to be done. Early in the study it should be possible to indicate which areas of expansion would best suit the long range growth of the institution.

Costs for acquiring land for expansion should be judged on a case by case basis. Real estate appraisals are usually needed to determine possible costs of acquisition, though a study of the relationship of assessed valuations and market prices can give some indications of the total price involved. Because land acquisition can rarely be accomplished overnight, careful strategies must be worked out as to method, procedure and time-table for acquisition. Public institutions are usually in a more favorable position than private schools, since the powers of expropriation and eminent domain can succeed where persuasion and price fail. The use of urban renewal legislation by both private and public institutions is still being tested, but affords unusual opportunities for combined institution and local government planning and land development. (See Chapter 7). In all instances advance estimates of probable cost are most useful in adjudging the economic feasibility of the development program and plan.

Utility Costs
Utility costs here refer to the extension of existing services not apportioned to individual building projects. A completely new system for example, a boiler plant or electrical sub-station would be included in the project listing for new construction. Utility extensions can be figured on a linear feet basis, and will vary according to the type of utility being extended and current construction prices for the region in which the project is located.

Stage 3. Changes caused by phasing of construction. There are two other minor stages in programming which may be only refinements. They are worthy of mention, however in order to complete the description.

The program lists gross quantities of physical improvements which must be provided to satisfy planning goals. The development plan indicates how these improvements might be scheduled by a target date. Particularly important is the sequence in which work is done during the planning period. Since there may be other alternatives in meeting these goals, space may be shifted from one department to another as enrollments rise and fall unpredictably during the planning period.

For example, at a southern state college, a recent study revealed that the agricultural management enrollments would gradually fall and those of food technology would rise. The two departments shared an obsolete building in the center of the campus, on a site better suited for general classrooms. The original program called for a new food technology building on the periphery of the campus, and a general classroom where the agricultural building stood. The improvements were scheduled for the same year. Political pressures from the legislature made it impossible to close out the agricultural department at an early date because there was sentimental attachment to the old "ag" building which was symbolic of the state's early contributions to higher education. The problem became one of phasing construction to meet both declining and rising departmental enrollments.

Stage 4. Penultimate adjustments. Despite differences that occasionally place reasonable men on either side of an issue, institutional planning is usually carried out with impartiality and intelligence. By the time the final program has been published, individual compromises have been made for the common good. But even at the moment of conclusion, changes will be made. Some of these modifications are political expediencies; others are chosen by a process of elimination. A board may decide that it cannot in good faith promote a new building program without first raising faculty salaries, "and there aren't prospects in sight for money for both." A sectarian college may opt to build a chapel rather than a new gymnasium. A conscientious president may defer construction of buildings for vocational courses, in favor of a stronger liberal arts program.

During programming a consensus will emerge on many issues, but there will always be a few items that escape logic and rationality. Last minute illumination — the fresh thought that sees new solutions for old problems—also tends to keep programming a process rather than a product.

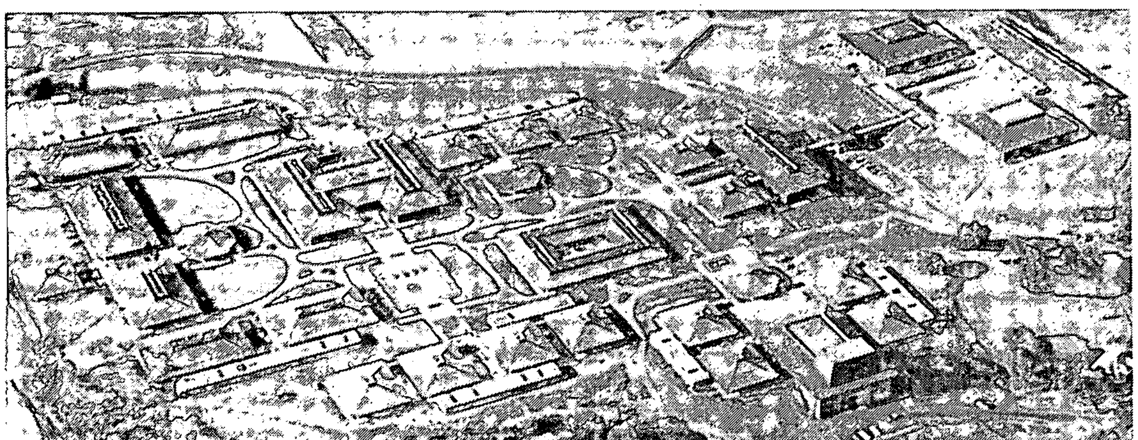
Planners for an eastern land-grant school carefully avoided the displacement of agricultural research plots, which obstructed the best direction for expansion. The institution's planning committee decided to exempt the plots as future building sites. An ingenious circulation scheme was planned to carry traffic around the agricultural grounds, in order to achieve an integrated campus. The preliminary plan was presented for the first time to the faculty. The chairman of the agricultural department was at the meeting and commented that the research plots looked "like pretty valuable land, and would it be possible to take up the soil, put it in sacks and carry it to another part of the campus." Further studies showed that this suggestion was feasible. A revised plan was prepared using the stripped test plots for building sites.

Then there are the accidents of God and man that may intervene between the time the program is completed and the plan published. The electorate may fail to vote the necessary bond issues; an important department chairman may be lured elsewhere, along with his entire research group; the library may burn down; and a losing football team may divert the legislature's support to a rival public institution across the state.

FOOTNOTES

1. Horn, Francis H. Dr.; "The Curriculum, Don't Leave It To The Faculty"; College and University Business; December, 1960.
2. Confidential memorandum to the author.
3. Confidential memorandum to the author.
4. Horn, quoted in.
5. "Academic Plan For The University Of California, Los Angeles"; 1962.
6. Confidential memorandum to the author.

5. Design in Planning



2

DESIGN IN PLANNING

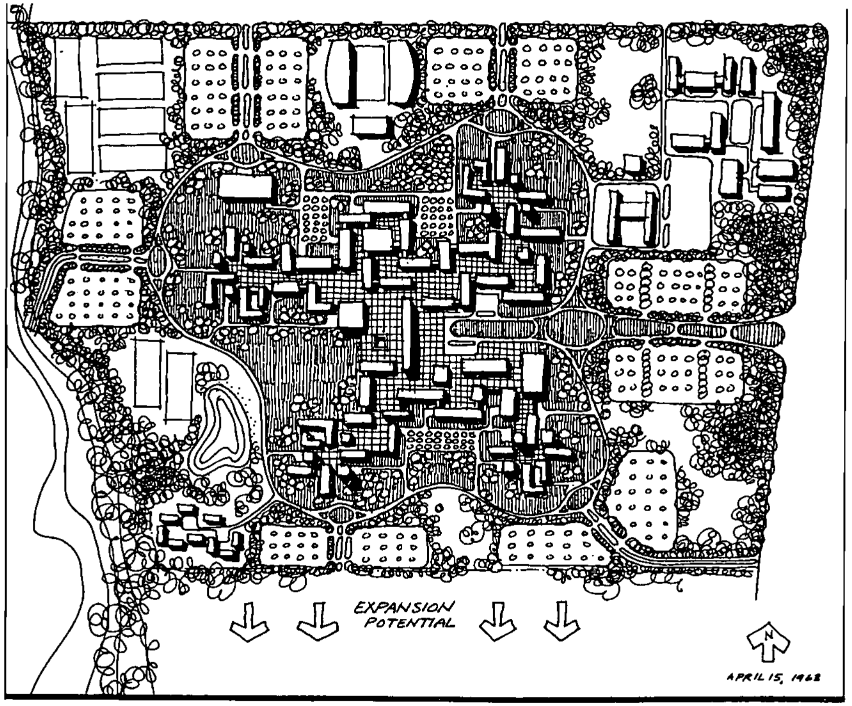
Design in campus planning centers around two sets of speculation: the question of appropriate *style* and the search for campus *form*. Those issues of form and style which relate to the overall campus design are problems of *structure;* those aspects which are typically matters of detail are problems of *content;* that is to say, the first is skeleton, and the second is flesh. As this book focuses on the overall campus design, rather than the detailing of architecture and landscape, structure is emphasized as a design problem.

Structure is the overall unity brought about through long-range planning. To provide a design structure for the campus the individual parts of the campus are first given internal consistency in accordance with their program requirements. Then the various parts are combined so that the collective identity is easily recognized as being a campus.

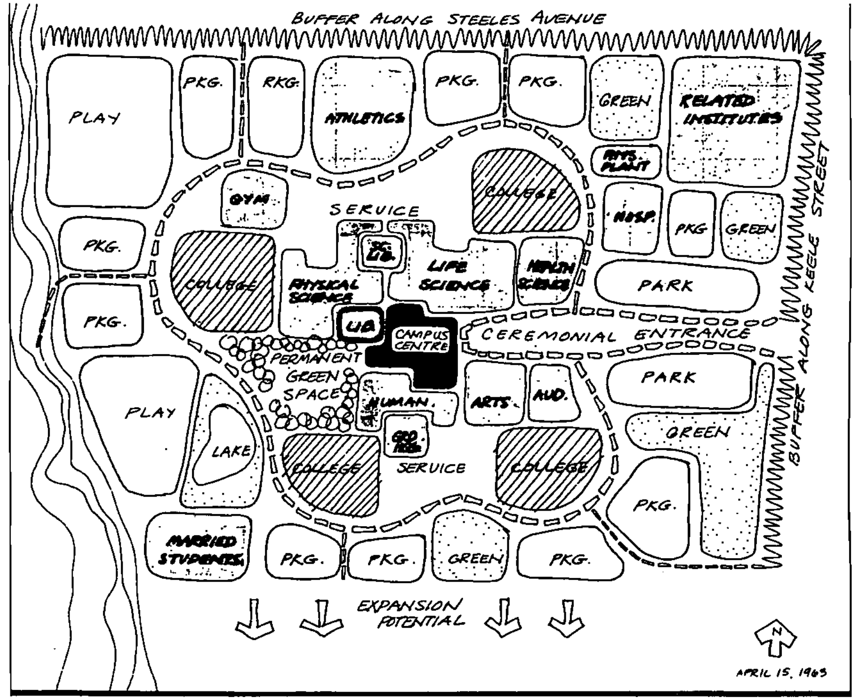
Content is largely a matter of project planning and project design. There are, however, functional goals common to the design of both structure and content—for example, convenience and communication, flexibility and amenity.

This chapter describes how structure is established in campus design; how some of the functional goals are satisfied by the arrangement of land uses, by formal architectural composition, or by open-space planning. Techniques for reinforcing structure will be discussed; i.e., the solutions to design transition—methods for adding new elements to old campuses so that structure may be retained or reconstituted.

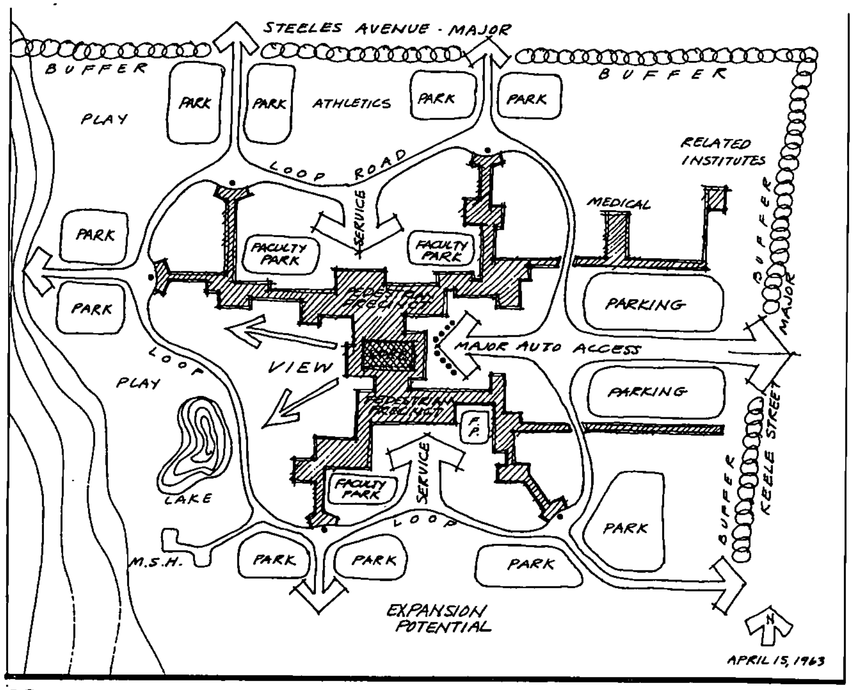
1
Oxford University (1958)
2
Foothill College, Los Altos Hills, California (1960)
Ernest J. Kump, Masten and Hurd, Associated Architects
Sasaki, Walker & Associates, Inc., Landscape Architects
PHOTO BY: CARL H. RIEK



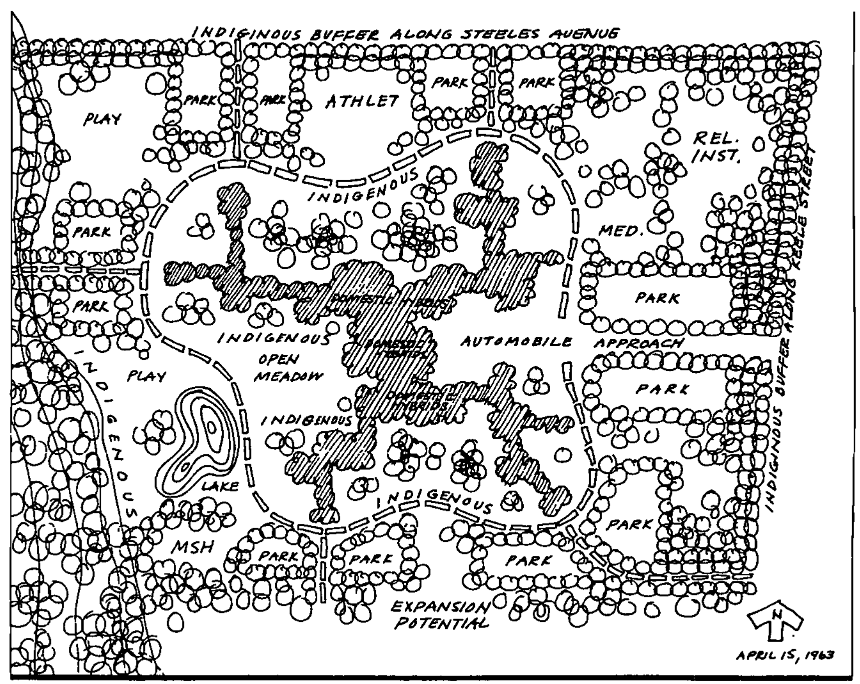
3A ILLUSTRATIVE SITE PLAN



3B LAND USE PLAN



3C CIRCULATION.



3D PLANTING

RUCTURE
nd-uses as design

The simplest form of structure is imposed by positioning land-uses (which can be called precincts, sectors, or districts) in accordance with the program instructions, and then by lacing the land-uses together with major circulation elements in a fashion that takes advantage of natural features and landmarks.

Generally the campus will be composed of a central precinct surrounded by other subsidiary use areas. The central precinct (central campus) contains the heart of the teaching-learning process. Though an institution may own several hundred acres, the diameter of this core is measured by the distance a student can walk in the time allotted for moving from one class to another. In campus planning it is common practice to put all instructional and related facilities within this time zone.

In the central campus, academic uses are clustered according to their program affinity. Because the library, union and administration buildings support instructional activities, these buildings are also given high priority in location and are typically sited in the central precinct.

In terms of space and time the maximum distance that can be traversed between classes depends on many factors: e.g., the nature of the terrain, how easily the classroom buildings empty and fill, the time it takes for vertical circulation, climate (allowing for putting on and taking off coats, hats and boots), and how well the campus path system is designed.

3A, B, C, D

Studies of the design of structure (1963)
Prepared by Stuart O. Dawson of Sasaki, Walker & Associates, Inc., for the development of York University, Toronto, Ontario.
U.P.A.C.E. Planners, Architects and Consulting Engineers.

Land-use arrangements, circulation system, and landscape, are the underlying binding elements as shown in the illustrative site plan.

Ten minutes is a typical period allowed for changing classes. Obviously, ten minutes is not a standard *per se* for describing the limits of the central campus, but rather it is indicative of the critical factor of *interchange* which must be carefully measured in establishing the central zone limits in any particular situation.

Interchange is the convenient movement of many people from place to place on timetable schedules. The efficiency and directness necessary of such circulation can be achieved through compactness. However, it may not always be possible, as campus activities may be dispersed due to earlier lack of planning, site impediments, administrative errors, or a desire to identify a department or professional school by separate and distinct land areas. *But no campus is so large, nor its purpose so obscure, that the circulation aspects of its structure should be equivocal.* In any journey, by foot or car, there should be a sense of departure, a sense of arrival, and a sense of orientation along the way. The circulation system should be appropriate for the scales of motion; as much as possible, channels of travel should be unscrambled for safety and convenience. The pedestrian must be separated from auto and service areas.

The campus design must also encourage fortuitous meetings between members of the institution. This cannot easily be accomplished if the campus design is either ambiguous or incomplete—particularly if the major circulation elements do not connect to natural crossroads, such as the union, library, faculty club, and administration buildings.

Where the normal interval between classes is 10 minutes the central campus area will have a diameter of approximately 1,600 feet, about 46 acres, or a zone of 2 million square feet of land. Assuming buildings with three floors above ground and one below (the general non-elevator type building structure) and a ground coverage of 25%, then this zone could theoretically accommodate about 2 million square feet of building. If each student requires about 400 square feet of instructional space, library space, union and administration space, then approximately 5,000 students could be accommodated in the central campus. *In effect eighty per cent of American colleges and universities could double their 1962 enrollments* and *accommodate the required academic and central campus facilities within the central campus at the generous densities described* above.

If professional schools, certain types of research and physical education instruction are removed just outside the boundaries of the central campus then a larger number of students can be accommodated. Increasing the density with high-rise facilities in special parts of central campus would also increase the capacity of the land for instructional facilities.

Assuming a central campus zone relatively free from parking (technically feasible), and considering the median enrollments of college and universities in 1962 and allowing for a doubling of enrollments in the next ten years, it would seem that at least 90 per cent of America's colleges and universities could function well by using a basic plan that consists of a central campus (instructional facilities, libraries, union and administration) surrounded by sectors devoted to other land uses.

Beyond a certain enrollment size, the interchange area will not be large enough for all instructional facilities and other typical central campus needs. While a small liberal arts college may be able to site all its facilities within the interchange area, a large university may have to reserve the central precinct exclusively for its undergraduate college and place special schools such as engineering, law, business and education around the periphery of the central campus.

In such a case, the positional relationships among the various parts may be determined in the academic plan, or can be charted and mapped by examining class enrollment records. For example, the likelihood of cross-registration between engineering and education is slight, whereas engineering and the physical sciences have some affinity in programs. The development plan would rec-

ognize this situation by placing the engineering sector and the physical sciences sector as close together as possible.

Outside the central campus, sectors would be organized by bringing together related programs; as for example, housing, playfields, special contract research. Here again, the program defines relative importance for the internal development in each precinct.

When the central campus and other areas have been organized internally, then the parts themselves can be arranged so that they express the hierarchical relationships between various sectors. The resulting overall form may be indicated either by land uses or planning modules. In the latter case, existing site elements can be represented to scale, and planned improvements may be given dimensions approximating a preliminary site solution.

Formal architectural composition

A more formal structure than that of land-use arrangements may be obtained by: determining in advance the sites for buildings; by establishing their massing and scale; by exploiting topographical advantages and special design incidents; and finally by interweaving roads, paths, and landscape into a unified whole.

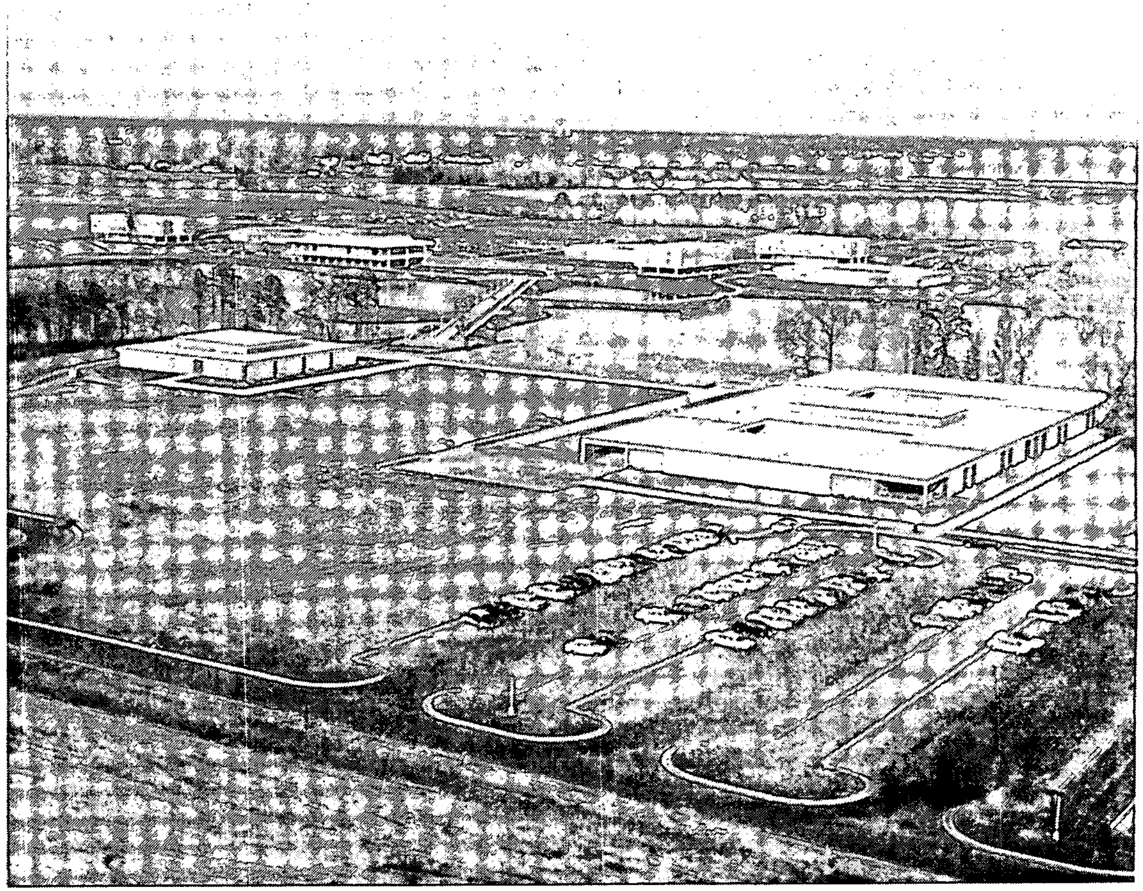
In the past this was the approach favored in the so-called classical campus plans. Such plans have fallen into disfavor for two reasons. First, the educational functions were crammed into the buildings after the architectural composition had been designed — form first, function later. Secondly, the buildings were not sufficiently flexible in interiors or site arrangements to allow modifications, changes and realignments to take place.

An interesting exception was Welles Bosworth's complex along the Charles River, built between 1912 and 1915, for the Massachusetts Institute of Technology (see page 246). The buildings were connected together, allowing subsequent contraction and expansion to occur in many directions as departmental enrollments rose and declined.

In a limited way a formal campus plan may still be a reasonable design solution on some campuses. The conditions for success of the plan are:

1. That buildings be flexible in their interior design to allow easy modification and expansion.
2. That enrollments and activities be definitely limited to a predetermined size.

Several new colleges in California, shown in Chapter 8, are being designed on these assumptions. They differ from the "complete plans" designed in the beginning of the 19th century, in that parking and circulation requirements are recognized and the architectural style is contemporary.



4

4

The Landscape as a Binding Element in Campus Form

St. Andrews Presbyterian College (1959)

Architects: A. G. Odell and Associates

Landscape development is to be encouraged because of the delights it gives in all seasons as an embellishment of outdoor space. But landscape is also important as a binding element in the overall campus form—as evident in the construction photo taken *before* the landscape had been realized.

PHOTO: ST. ANDREWS DEVELOPMENT OFFICE

Informal structure

A structure less rigid than the formal plan, but still definitive, can be obtained by identifying: sites for construction; open spaces which are to serve functional purposes such as playfields and agronomy research plots; and open spaces designated as amenity. The construction sites are organized into building zones; permissive standards are then established for each zone on the basis of design studies. Permissive standards include such controls as floor area ratios, setback lines, parking requirements, ground coverage ratios, perhaps even types of building materials. These standards allow great flexibility in project design, but at the same time control the density, character and location of development.

Since few institutions have a ground coverage exceeding twenty-five per cent, the manipulation of built-up areas and non-building areas can produce excellent structure in long range plans. The skeleton thus created would consist of open spaces, building zones and major circulation elements.

This type of design plan is readily amenable to staging. Change is inevitable on campus; temporary buildings must give way to permanent facilities; new buildings must be added, and utilities and roads extended to meet projected increases in enrollments. Older structures have to be modified and altered or replaced. Staging controls the sequence of change so that all improvements are brought together into a cohesive entity. A sense of completion is needed, not only at the moment of final synthesis, but also at designated intervals throughout the planning period. When a well balanced planning program is being conducted, the open space plan gives excellent results in structuring campuses: it affords a richer design expression than land-use and circulation arrangements, while not depending upon the design form based on projects which may never be executed.

Reinforcing Structure

For the most part, American designers, in placing new buildings on old campuses, have preferred to have each building stand free from its neighbors, rather than tie the old and the new directly together. As a result, many American campuses are diffused, amorphous, haphazard collections of motley buildings, rather than a single entity which can, in design terms, realistically be called a campus. (See air photos, page 218.)

Some campuses which have retained a classical pattern of development are also diffused. Their monotonous overall design stems from an insensitive and unknowledgeable handling of site composition—unknowledgeable, because the Roman forums, Greek acropoli, and Renaissance architecture from which the classical plans were supposedly derived, were exciting, cohesive collections of buildings and open spaces—quite different in overall design from that which today purports to be of ancient and honorable origin.

Similarly, the Gothic, or medieval precincts, which have served as a source for some American collegiate designs, were contiguous developments, not free standing units. The best of the American collegiate Gothic campuses are those which have developed precincts, or quadrangles; the pathetic campuses are those institutions which could not accumulate the wealth needed to obtain the enclosure, so necessary to completing a medieval-like scene.

Dispersion—the lack of interrelationships between the parts—will continue to be a major problem of overall campus design in the decades ahead. Formal and rigid plans suitable for execution over a long period of time will be exceptional. Architects by proclivity or training may be unable to join the old, the new and the newest in a satisfactory manner. There will be a large number of buildings which cannot lend themselves to contiguous development. On many campuses, whatever structure is established in the future through campus planning will have to be reinforced visually by site design, landscape development and architectural style.

Structure through site design

Structure may be reinforced through site design by placing foreground buildings in positions where the architecture terminates vistas, or dominates a closely integrated series of background buildings, or serves as a climax to a sequence of spaces through which pedestrians or vehicles move. Foreground buildings have special symbolic meaning to the institution—they may be unique in program purpose, or outstanding because of their historic importance or memorial qualities. Typical foreground buildings are: library, chapel, union building, auditorium, or the dining hall in a residential complex. Background buildings tend to be classroom, laboratory facilities, and dormitories. Outdoor spaces, too, can be either foreground or background elements, and the principles of design applied to their arrangement are pertinent also to the landscape.

The landscape development plan as a reinforcement of structure

The landscape development plan is a long range, comprehensive illustration of the overall campus design as it might appear upon completion of all projects. The scheme is also prepared to indicate the sequence of development for individual landscape projects; in this respect it is a document which helps coordinate all aspects of physical plant development:

". . . (producing) a clearly apprehended scheme in which there is a studied and happy balance of things; of buildings located with regard to their functions, importance and architectural effect; of natural views conserved and topographical advantages skillfully exploited."
(CHARLES Z. KLAUDER)

A good example is the Drake University landscape development plan. Major features are:

1. *Identification of campus boundaries.* A screen composed of pyramidal shaped street trees was selected to mark the peripheries of the campus and to separate the campus

visually from its environs. These bands soften what otherwise would be a too abrupt transition from the large parking lots and tight residential developments, which are on the fringe of the campus, to the park-like scale of the university grounds.

2. *Establishing gateways.* At predetermined points, the outer screen is punctured and the landscape elements are composed to form a series of gateways.

Functional gateways. Where traffic has to enter utilitarian spaces such as parking lots and service courts, the line of trees has been interrupted in order to clearly mark the entrances to these areas. No special design effect is stressed, but the selection and placement of plant materials reflects safety, ease of circulation, and the need for minimum maintenance.

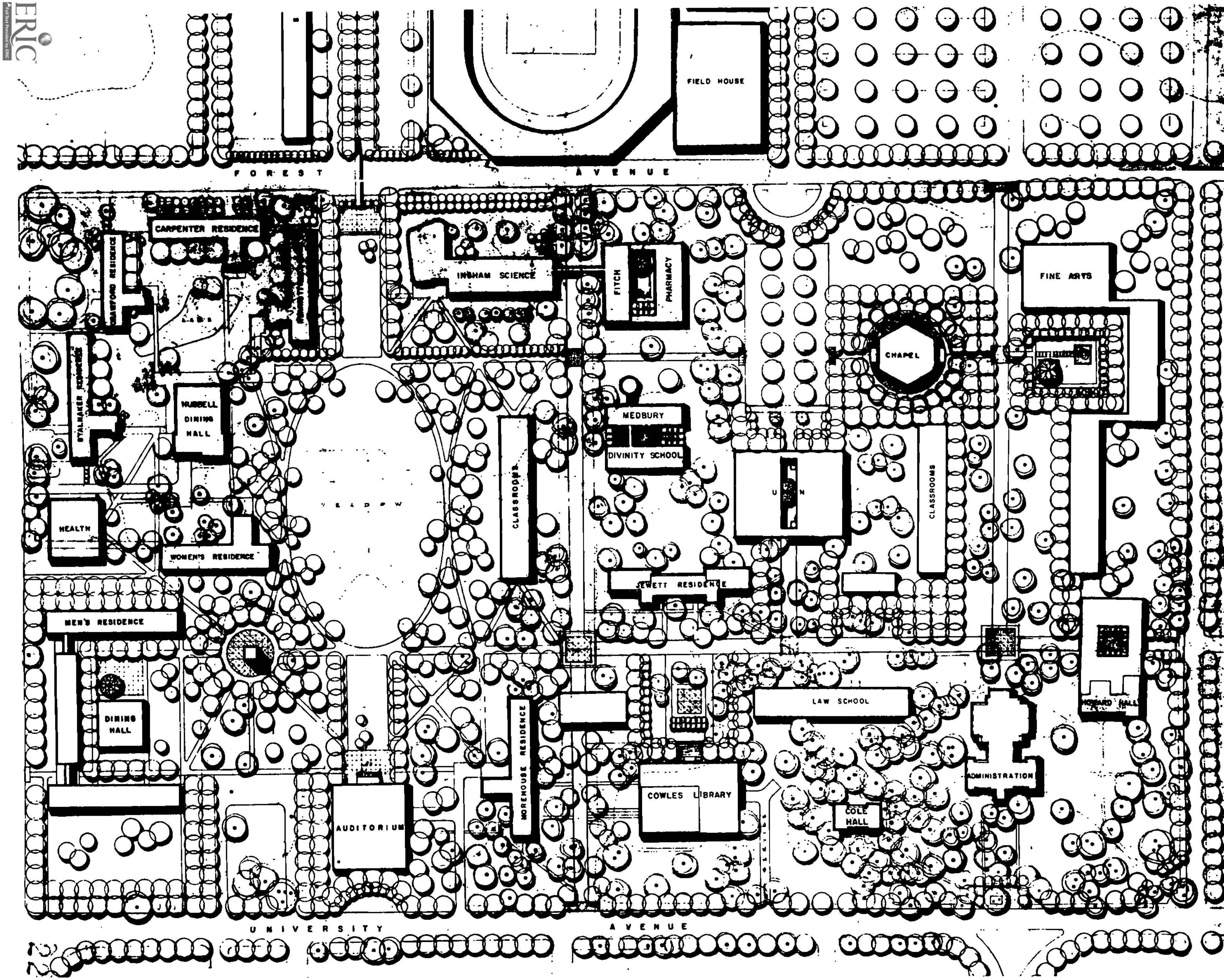
Symbolic gateways. Buildings that are used by the public have been given prominence by occasionally changing the character of the screen so that Old Main (the administration offices) and the auditorium stand out from residential and instructional buildings. The landscape treatment differs from that of functional gateways, in that a distinctive design expression emphasizes the importance of the buildings.

Transition areas. The landscape design designates those points where pedestrians enter the campus at special places. These gateways are treated as climaxes to the interior path systems.

3. *Manipulating the path system.* Since the central campus at Drake is free from auto traffic, the path system is an important part of the skeleton. Major paths are identified by special design effects, such as paving, plant materials and lighting. Changes in topography and existing site conditions are utilized in the design so that the paths do not extend visually in a straight line. The journey is broken up now and then by introducing special design incidents. For example, in moving from the residential area to the classroom, the pedestrian may leave an informal sitting space in front of the dormitory, move along a wide path that has a uniform line of trees on either side, pass through a tight space with a sitting area on either side of the path, cross another path that has a long vista, and, a little further on, arrive at another special open space situated in front of the classroom building. Through all this the pedestrian will sense that he is moving in the right direction. This kind of design experience cannot be arrived at casually, but is the result of careful analysis of where and how architecture and site afford opportunities for manipulating the landscape and strengthening structure.

As with the Harvard Yard and main quadrangles of many campuses, a major open space serves as a physical element binding together many different kinds of buildings. At Drake University, the major open space is designed as meadow, an echo from the earlier days of the university and the state of Iowa. This nexus is a large grass plain, edged on either side with informal groups of trees. (See plan page 215.) The meadow lies between the residential quadrangle and the academic area, directly along the major north-south pedestrian path. One end of the meadow blends into the formal space in front of the auditorium; the other end serves as a transition zone to the north campus and athletic plant. Thus, anyone moving across campus is oriented by sensing his position with reference to the meadow, and in turn is aware of the campus structure.

5
Drake University Landscape Development Plan
Des Moines, Iowa
Sasaki, Walker and Associates, Inc. (1959)
Architects: Harry Weese and Associates
The Drake University landscape development plan is a good example of how the landscape plan can reinforce structure. Land uses were arranged, the sites were selected for buildings, and the buildings were shaped on the basis of preliminary architectural programs. The organization of buildings and paths formed a structure which was strengthened through landscape design by:
(a) visually separating the campus from its environs;
(b) by designing gateways so those entering or leaving the campus, or passing by, would be reminded that the campus is a special place;
(c) by connecting the gateways to an interior path system which serves as a skeleton for joining the various sectors together;
(d) by identifying the sectors as special areas, but connecting them to the whole through the use of landscape and building materials which are repeated in all areas of the campus.


FOREST AVENUE
FIELD HOUSE
FINE ARTS
CHAPEL
FITCH
PHARMACY
INGHAM SCIENCE
CARPENTER RESIDENCE
CRAWFORD RESIDENCE
STALNAKER RESIDENCE
HUBBELL DINING HALL
HEALTH
WOMEN'S RESIDENCE
MEN'S RESIDENCE
DINING HALL
MEADOW
CLASSROOMS
MEDBURY
DIVINITY SCHOOL
UNION
JEWETT RESIDENCE
CLASSROOMS
HOWARD HALL
LAW SCHOOL
ADMINISTRATION
COLE HALL
COWLES LIBRARY
MOREHOUSE RESIDENCE
AUDITORIUM
UNIVERSITY AVENUE

222

AMENITY

Landscape combines utilitarian aspects and amenity in reinforcing the campus structure. A well designed building will produce amenity, but in structure amenity will depend largely on how the landscape is treated. Physically, there is usually more open space than space devoted to buildings. Few single buildings can hold together the entire campus design.

Amenity—the pleasantness of the place —is a desired goal in its own right, but has special purpose in campus planning because of the peculiar nature of institutions of higher learning. Rarely do people these days live, work and play in a single environment, as they do at most of our colleges and universities. Amenity is needed to afford physical and psychical relief from the heavy demands placed on students and faculty.

In structure, amenity may be achieved in several ways. The skillful designer will incorporate in his design plan the natural beauty of the site and environs, as well as existing man-made features which have been identified in the survey and analysis stage as having special importance to the institution. All these elements will be exploited in arranging circulation systems and land uses, so that the structure is clear and coherent, and offers a sense of security and orientation. The campus plan will be legible to the observer, the visitor, the resident.

The design of campus sectors will indicate the functions of the parts. Thus, a residential scale may be introduced into a dormitory area whether high rise or low rise buildings are used, just as different housing types can be given an appropriate residential scale in urban areas. The scale of technology can be recognized in engineering and research buildings. A quiet, meditative atmosphere may be designed for one sector; a gregarious spirit can be reflected in the design of another.

How can "gregarious" and "meditative" be designed? Design, as a response to program instructions, can encourage communication through the strategic placement of buildings, roads and paths. Campus precincts may either be insulated from one another or integrated. The overall landscape design can screen out and dilute activity, or adjust site conditions so that tempo is sensed. Some sectors of the campus may be designed for public use. Other campus spaces may be of a private character, with access limited to those who live in or use the architecture to which the spaces are related. The total site composition can turn inwards from its environs; or by carefully locating campus gateways, building entrances, underpasses and other design elements, it can be interlocked with the environs.

The substance of amenity will be achieved through the design of content—the architecture of buildings and landscape. American campus designers have had good success at this level of design. Hopefully, equal inventiveness and sensitivity can be applied to structure so that overall campus design can provide its own share of amenity, rather than detract from it as it does today.

6A

General plan of landscape development
University of Illinois, Urbana-Champaign Campus
Prepared by the Division of Campus Development
Consultants: Sasaki, Walker & Associates, Inc.

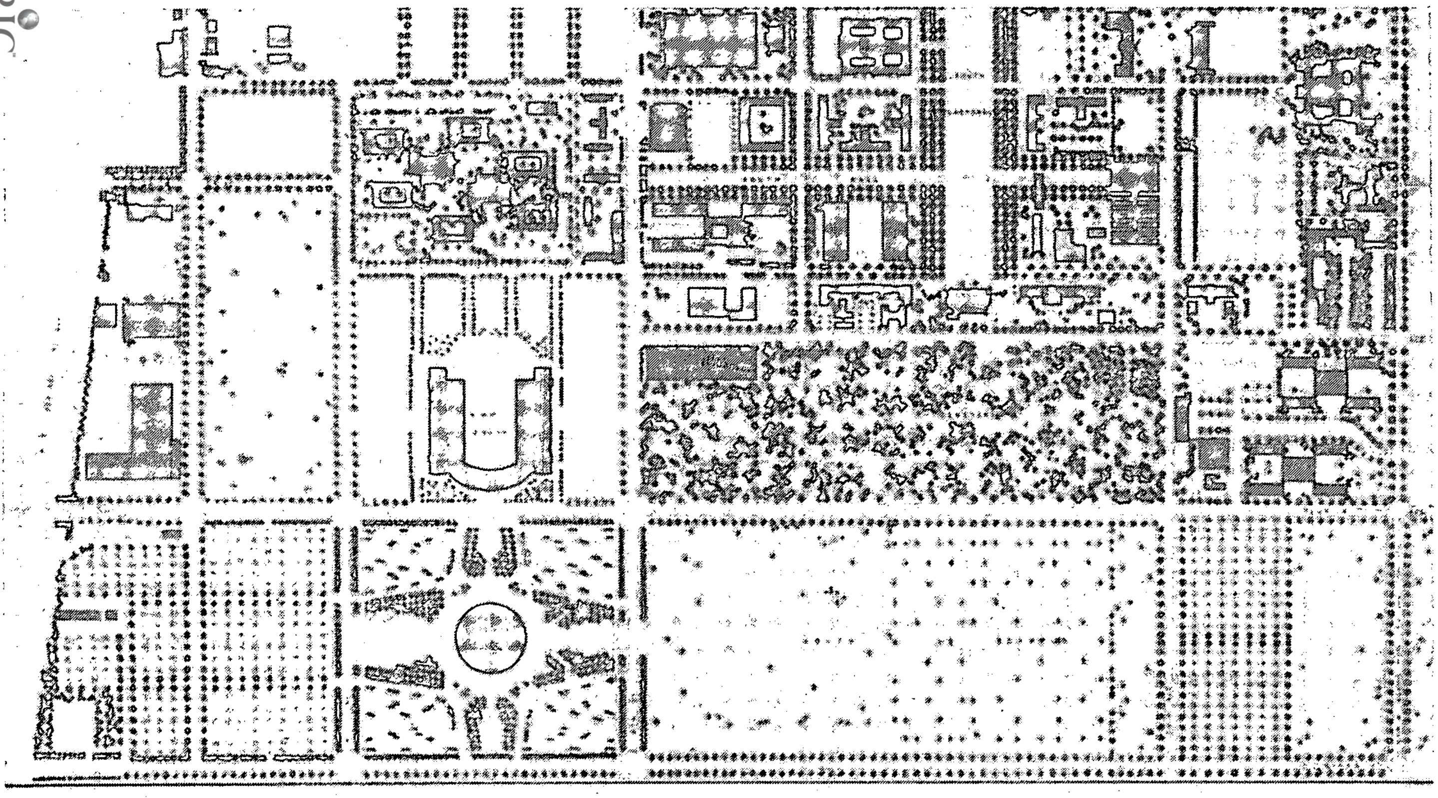
One of the objectives of the landscape plan was to restore the amenities and design structure on campus, which had been lost because of the Dutch Elm disease.

6B

Campus as it appeared just after World War II.

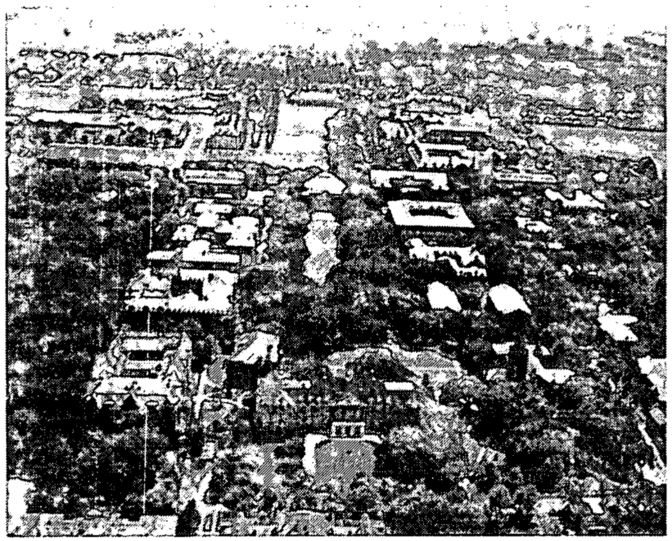
6C

The campus, 1961.



GENERAL PLAN OF LANDSCAPE DEVELOPMENT - UNIVERSITY OF ILLINOIS

6A



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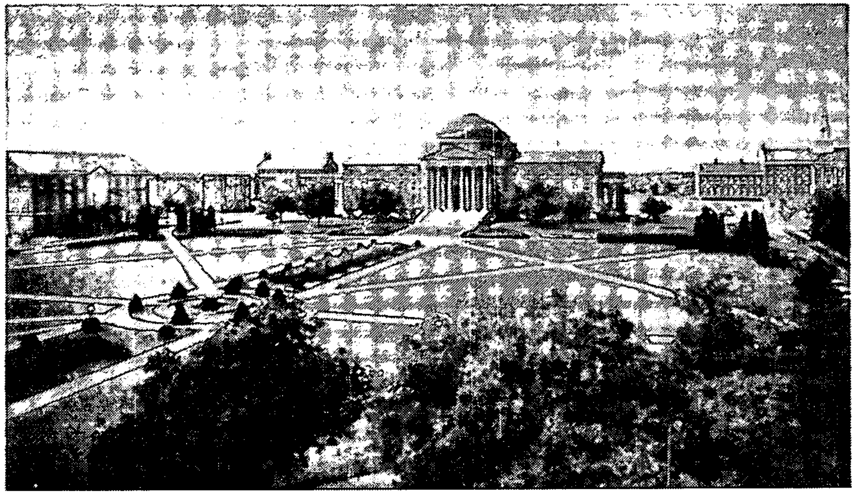

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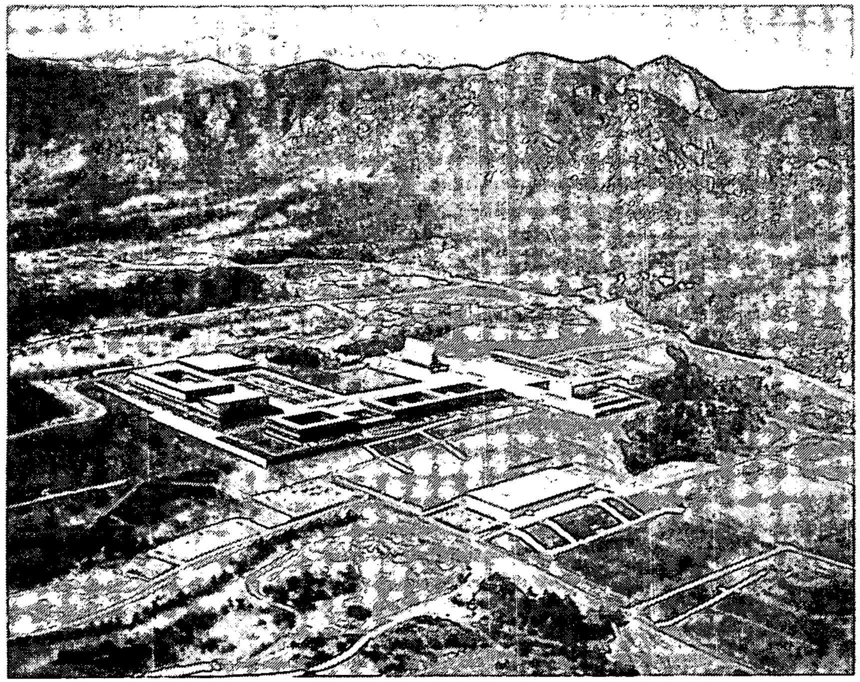

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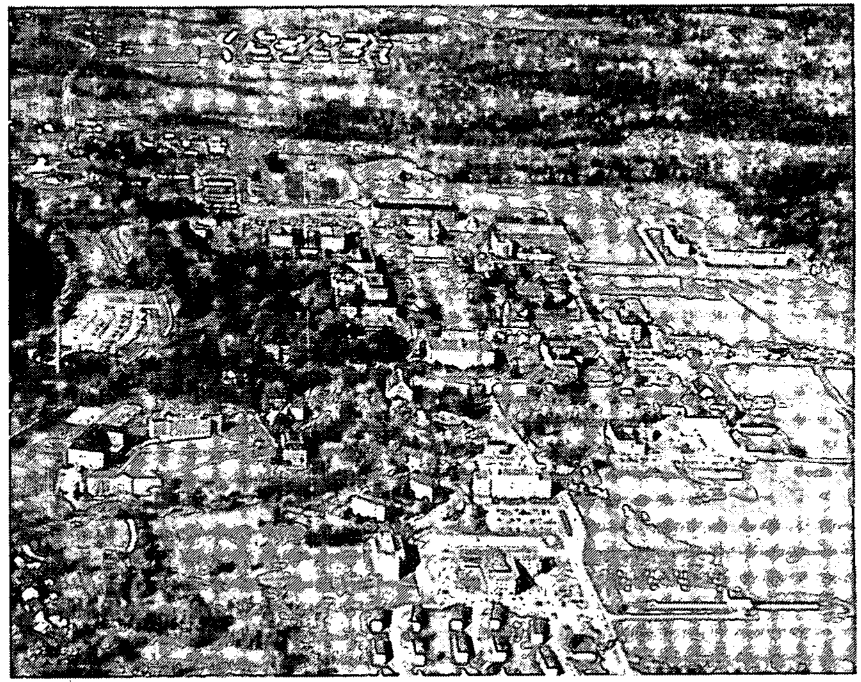


9

10

Homogeneous Campuses

7

Southern Methodist University

Master Plan prepared by Bremer W. Pond (1926)
Shepley, Rutan and Coolidge, Architects
PHOTO BY MESSINA STUDIOS

8

United States Air Force Academy (1958)

Skidmore, Owings, and Merrill, Architects and Planners

Heterogeneous Campuses

9

University of Maine (1961)

Orono, Maine

10

Lafayette College (1961)

Easton, Pennsylvania

STYLE AS STRUCTURE

The selection of style, historic or contemporary, will not, of itself, secure a good development plan. But the consistency of attitudes toward style can visibly reinforce structure. Style is used here as "an illusion of classed order"—the family resemblances among a group of buildings which give a common denominator. As it pertains to the collective identity of the overall campus design style is either homogeneous or heterogeneous — closed-ended systems or open-ended systems.

Again referring to the overall campus design, typical examples of closed-end systems (homogeneous) range from the use of the historic idiom (Georgian) at Southern Methodist University, to the contemporary entity at Skidmore, Owings, and Merrill's Air Force Academy. Campuses tend to be homogeneous when a great number of buildings are constructed at one time; or when an institution holds the belief that architectural consistency comes best through simulating older styles in new buildings. Campuses with homogeneous architecture usually have formal planned relationships between buildings and groups of buildings. The campus plan is highly organized; landscape, paths, roads, open spaces and buildings are composed into a strikingly singular entity. The designer's palette, as far as building materials are concerned, is deliberately limited.

Heterogeneous campuses (open-ended) are marked by great variety in the use of building materials and by many different facade treatments. There is little regard for a kinetic unity, which can be obtained when the scale and massing of buildings are organized into an overall design. With some important exceptions, as will be noted, heterogeneous campuses tend to have confused structure and visual disorder. This may have occurred because institutions have ridden the roller coaster of changing taste in architectural design. More often than not their histories will disclose that buildings were located where they would be most prominent at time of construction, rather than at sites for long range convenience.

Heterogeneous disorder is not merely an unattractive by-product of eclecticism, but also reflects an appalling inconsistency in attitudes towards design, as is apparent on campuses which have (since World War II) tried to keep up with the annual new models in architecture. The last decade and a half has been a period of great invention in architectural styles—again, style is defined as the common denominator which makes it possible to indicate family resemblances. Some institutions can be compared to New York's Idlewild Airport: they have attempted to acquire every conceivable contemporary expression of the building arts. And like Idlewild Airport, in doing so, they have managed occasionally to get outstanding single buildings, but the total effect is a dismal failure. As Joseph Duveen berated one of his affluent clients, the institutions have failed to distinguish between an accumulation of art objects and a collection that has a central theme.

Style In An Age Of Invention

In opting for closed-ended or open-ended systems of style, the choices are affected by the problem of design standards in an age of invention. The careful attention that was given to detailing, massing, scale and selection of materials in the days when the historic idioms (such as Georgian or Collegiate Gothic) were in full bloom, is missing in recent commissions simulating the historic styles. Today's watered-down versions are visually inferior to their progenitors and embarrassing as architecture when they are located close to their elders. This lack of sensitivity is apparent in the overblown proportions of the buildings themselves, as well as in the shallow, ugly and even inept handling of the site on which they sit. Judged by accepted standards in their own category, such buildings are inferior as architecture.

This situation has come to pass because institutions have not been able to pay the cost of construction, the cost of materials, and the cost of continuing maintenance required by the historic idioms. In addition, the craftmanship necessary to achieve the full textural effects of the historic idioms are no longer available. There are few firms still in practice which are competent enough to produce the drawings and specifications necessary to a well-designed historic building. Good Georgian and Collegiate Gothic have become a matter of expensive archeological reconstruction. New buildings, true to the prevailing architecture of a half century ago, are a novelty rather than a subject of current practice.

As to contemporary architecture in this period of invention, standards are less secure than in a period when art is closed-ended and coalescing its gains. To mistake something new for something good is an ever present danger when executed examples are not available for comparison. Though statistical account has not been made, it is my impression that there were as many inadequate campus buildings constructed in contemporary styles in the last decade, as there were buildings constructed in imitation of the historic styles. In some respects the body of criticism necessary to maintain standards of design, has neglected the issues of execution and performance in favor of holding off inevitable change (in the case of those still sympathetic to the older architecture), or cementing hard fought philosophic gains (in the instance of supporters of contemporary styles).

Directions and choices

All signs indicate that in the next decade, major construction on campus, will reflect contemporary concepts of architecture rather than historic styles. On some campuses, large groupings of buildings will be erected at one time, under the direction of a single architect. In precinctual development, where one group of buildings is likely to be designed within a short period of time on one site, homogeneity in style can be effective. With each group having an internal program consistency, design as style can identify the grouping as a sector of the campus. Materials of construction can serve as thematic recalls

of other sections of the campus. Continuity may be obtained by treating the ground plane with materials that are used in other sectors of the campus.

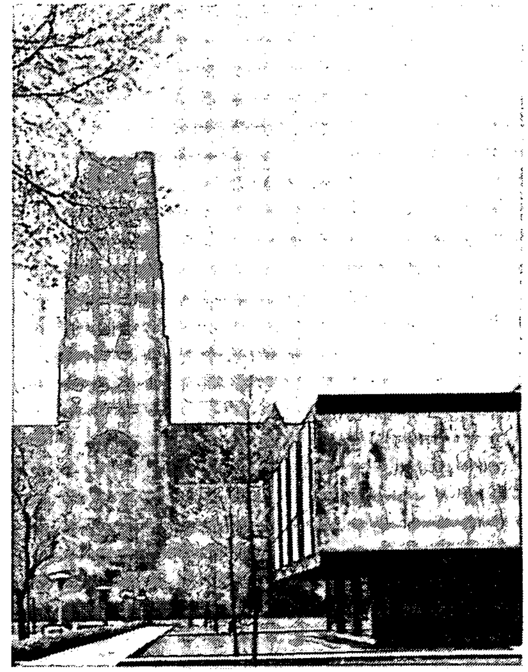
The selection of a contemporary style to impose a homogeneous structure over the entire campus may be more serious than a simple lapse in taste. Until standards in design among the contemporary idioms reach the level they undoubtedly did when historic idioms were carefully detailed, this year's fashion may be next year's failure. Thus, when heterogeneity is followed in campus design, any damage caused by a single building is slight—provide other aspects of the campus structure are strong enough to accommodate the eyesore.

A reasonable policy in matters of style would reflect a respect for that which has been done and a willingness to accommodate that which is new. Vitiation in style is inevitable, even in contemporary architecture, which has not yet achieved a sense of timelessness. This generation's taste doesn't necessarily possess intrinic qualities, symbolic or otherwise, for the next generation.

"No living organism can be copied; for a civilization is not made by mere acts, but by traditions and impulses left behind them. These alone can be handed on, to be assimilated, nurtured and reborn in a new shape, alive and in different hands. Unless such a process takes place, the mere imitation is dead."
(FREYA STARK, "ALEXANDER'S PATH")

Since the developed parts of existing campuses may receive individual buildings by individual architects, heterogeneity is apt to continue, or may even occur on those campuses which have clung to a historic style. But the visual chaos now apparent on many heterogeneous campuses need not continue if a rational structure is established through planning, and if the skills of the designer are used to reinforce structure.

Fortunately, there is a body of experience that can be drawn upon in making the transition from heterogeneous disorder to heterogeneous structure. The old and new can be melded together to form a unified whole. Provided that proper regard is given to long range planning, the principles of design transition can also be applied to new campuses which display homogeneous contemporary styles—campuses which will eventually face the same problems posed by historic styles in this generation.



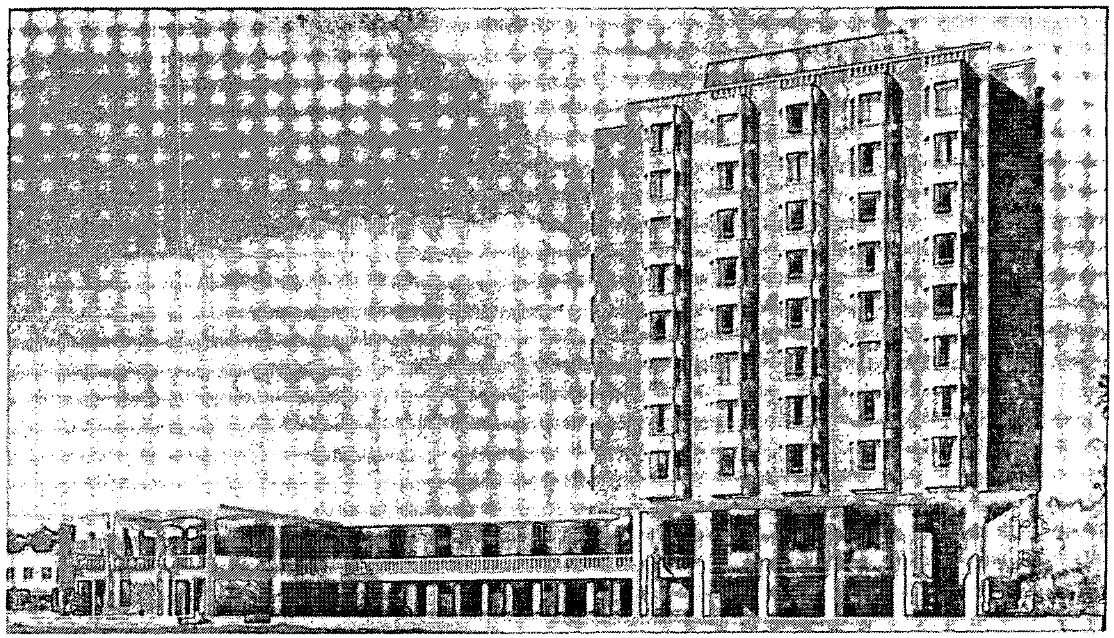
11A

11A
The New Dormitory (1958), University of Chicago
Architect: Eero Saarinen & Associates

A possible conflict in styles is handled by treating the new buildings as simple, low-lying geometric forms—in contrast to the soaring, sculptural masses of the earlier styles.

11B
Stanley R. Pierce Hall, University of Chicago (1960)
Architect: Harry Weese and Associates

The design traditions of the University of Chicago, recast in contemporary form.
PHOTO ABOVE: HEDRICH-BLESSING



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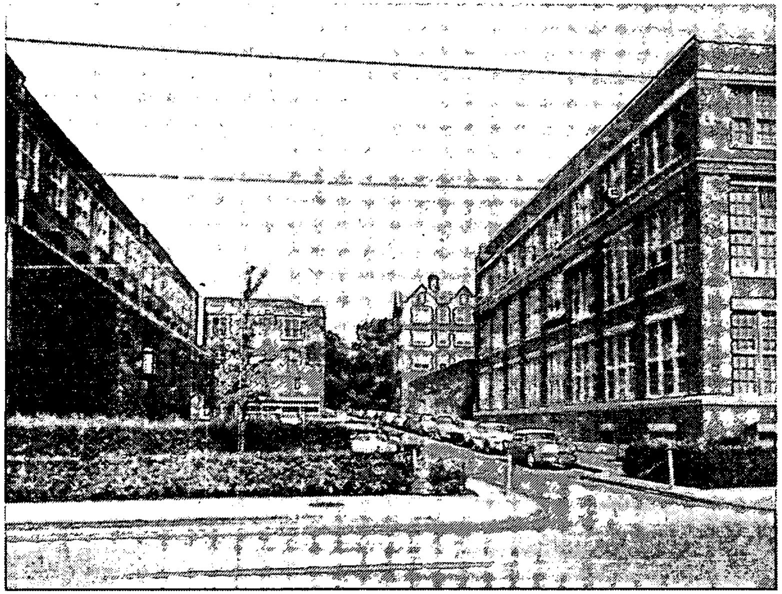
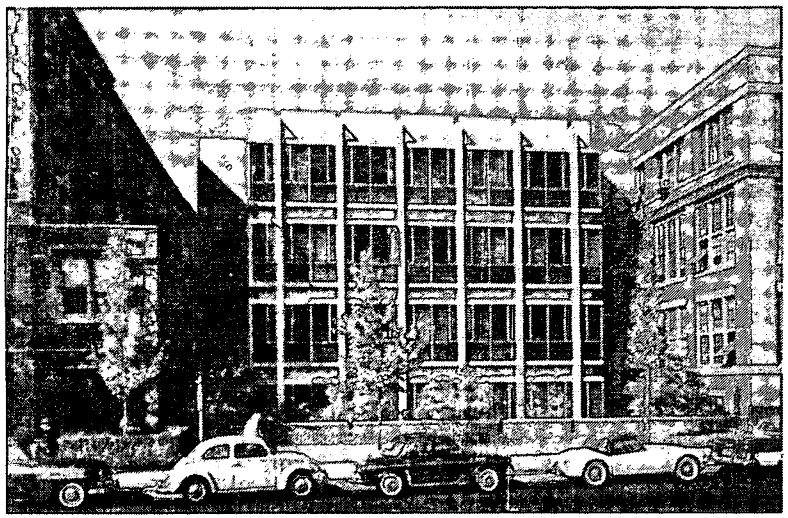


12A



12B

12A, B
Moore Institute of Art, Science and Industry (1960)
Philadelphia, Pennsylvania
Architects: Geddes, Brecher, Qualls and Cunningham
The fitting together of old and new requires sensitive regard for scale, materials and siting. Such design transition can be skillfully accomplished without compromise, as shown in these before and after photographs of an AIA award winning building.
PHOTOS: LAWRENCE S. WILLIAMS

DESIGN TRANSITION

Principles of design transition—the change from heterogeneous disorder to heterogeneous structure—are illustrated in four examples below. As would be expected, two of these cases (Harvard University and the Rhode Island School of Design) are located in the oldest institutional neighborhoods in the United States. The last example (The University of New Mexico) exemplifies the solutions of problems concerned with a strong historical style of regional architecture.

The Harvard Yard comes readily to mind as an area in which heterogeneity has been overcome to achieve a singular unity. The design structure of the Yard is helped considerably by fences and walls which separate it from its environs. The total acreage is small enough so that a six minute walk will carry the pedestrian from one boundary to another; however, an overall impression cannot physically be gained from any one ground position. Unity is sensed, despite a collection of disparate buildings, which reflects the full history of American architecture.

This unity has been achieved largely because:

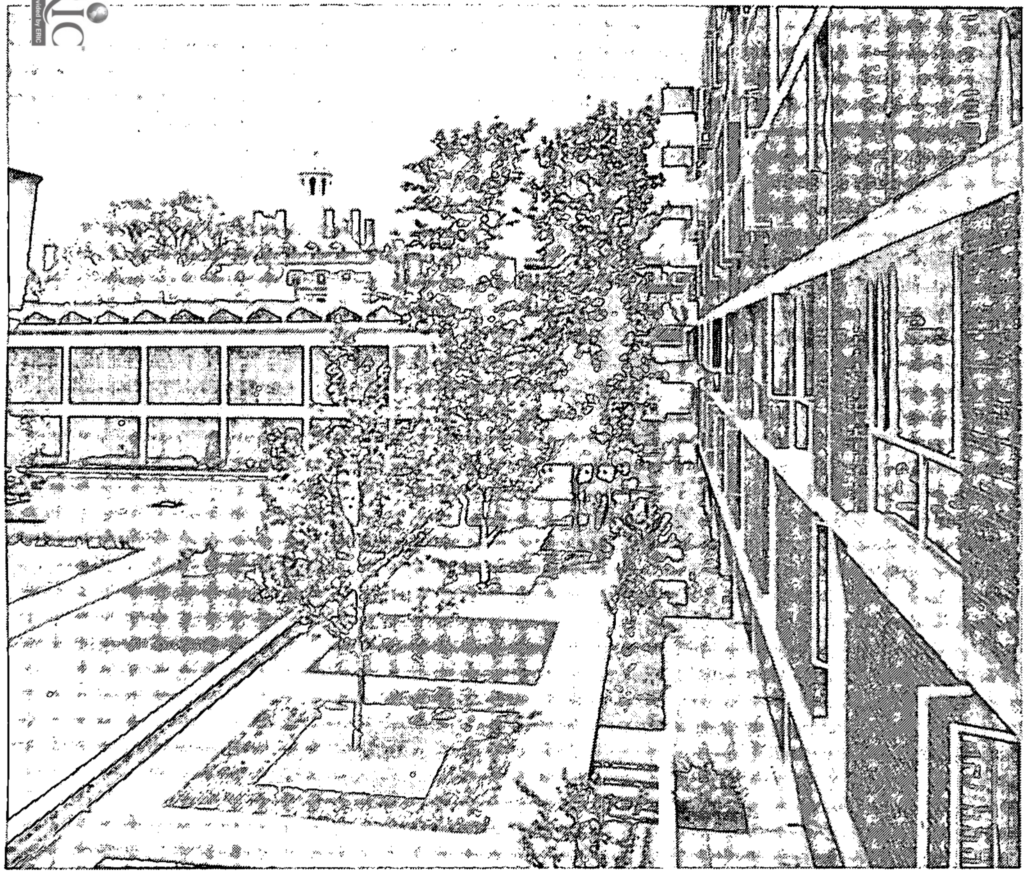
1. Of its kind, each building, even when a renovation, is a first-class example of the craftsmanship of the period it represents. There has been respect for scale in elements such as roof lines, massing, fenestration, and doorway treatments. Emphasis on red brick, limestone, and painted white surfaces as building materials, creates a series of recalls and design themes.
2. With the exception of Widener Library, full respect has been given to neighboring structures in siting buildings, especially in the corner-to-corner relationship. Spaces in which the buildings sit or are enclosed, are well arranged so that unity and commodity go hand-in-hand with aesthetic sensing of the space sequences. The major space is framed on two sides by the important symbolic buildings: Widener Library and Memorial Chapel. This central area is the climax of any movement from one side of the Yard to another.

3. Elements of the landscape are judiciously placed so as to complement the architecture, give relative proportions to the various outdoor spaces, and strengthen the lines of movement from place to place.

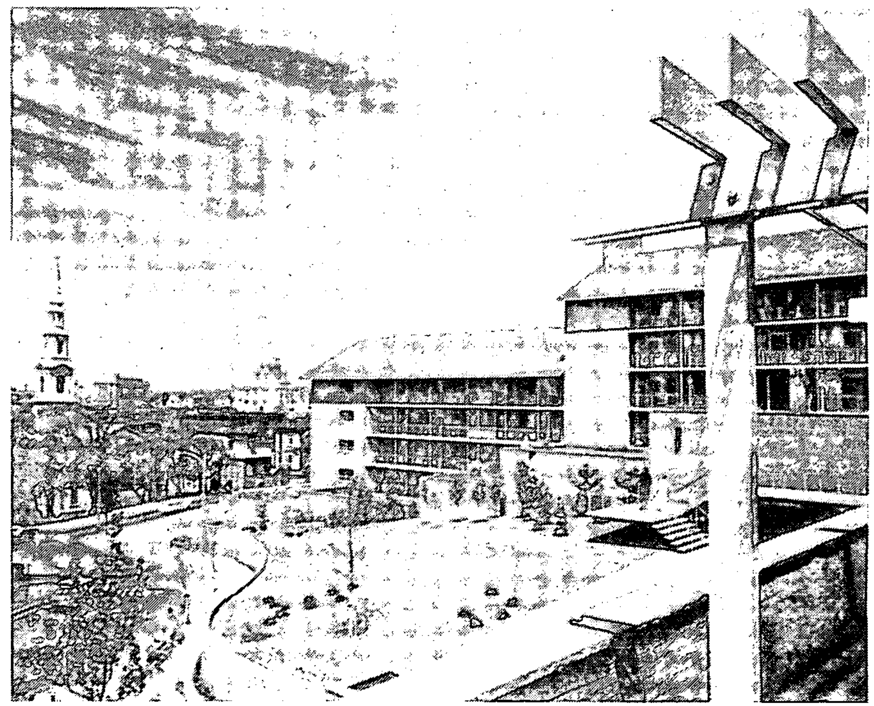
Quincy House is an excellent example of how this principle has been applied in recent construction outside the Yard. As illustrated on page 223, Quincy House is thoughtfully integrated into the older grouping of Neo-Georgian buildings, without compromise to contemporary architectural standards, and with full regard for the institution's traditional approach to housing.

Eventually Quincy House, the older parts of Harvard, and new sectors will be connected by a skeleton of pedestrian paths and open spaces. (See illustration 13.) This respect for a sense of place — the historical atmosphere—is also evident in the design solution for the new dormitories at the Rhode Island School of Design, located on College Hill in Providence, Rhode Island. Here, the problem of melding old and new was not so much a transition from individual institutional buildings, but a requirement for establishing a scale of buildings and a palette of materials that reflected the environs.

13



14



15

13

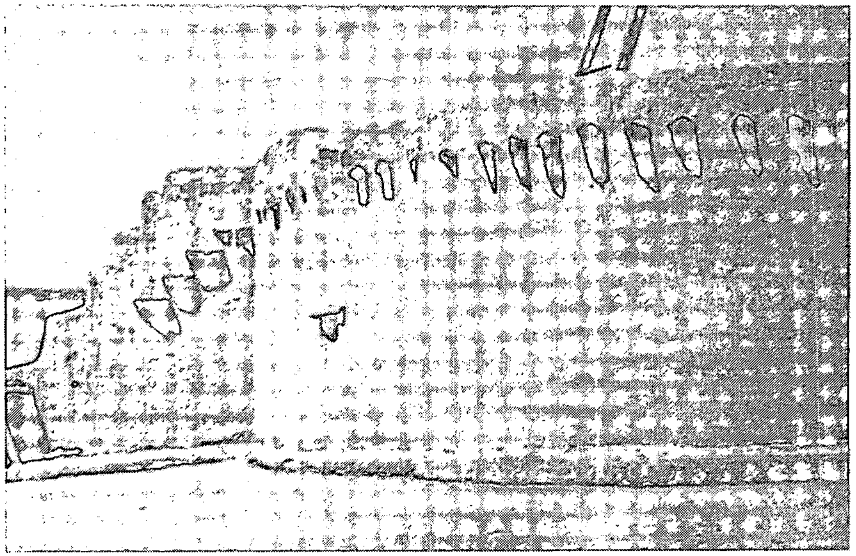
Proposed open space system for Harvard University
From: An Inventory for Planning

14

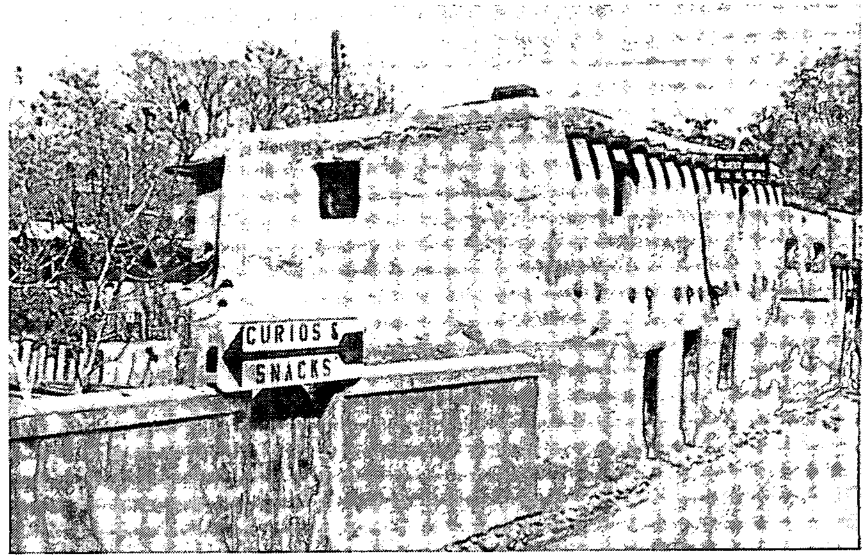
Quincy House, Harvard University (1960)
Shepley, Bulfinch, Richardson and Abbott, Architects
Sasaki, Walker & Associates, Inc., Landscape Architects
PHOTO: GOTTSCHO-SCHLEISNER, INC.

15

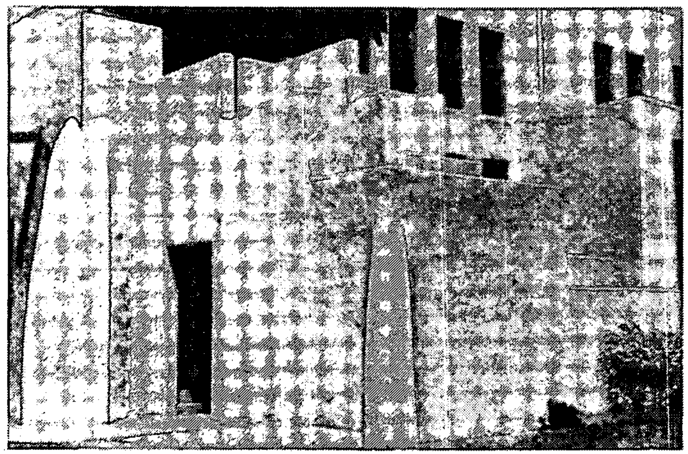
Rhode Island School of Design (1959)
Providence, Rhode Island
Architects: Robinson, Green and Beretta
Design Consultant: Pietro Belluschi
Landscape Architects: Sasaki, Walker & Associates, Inc.



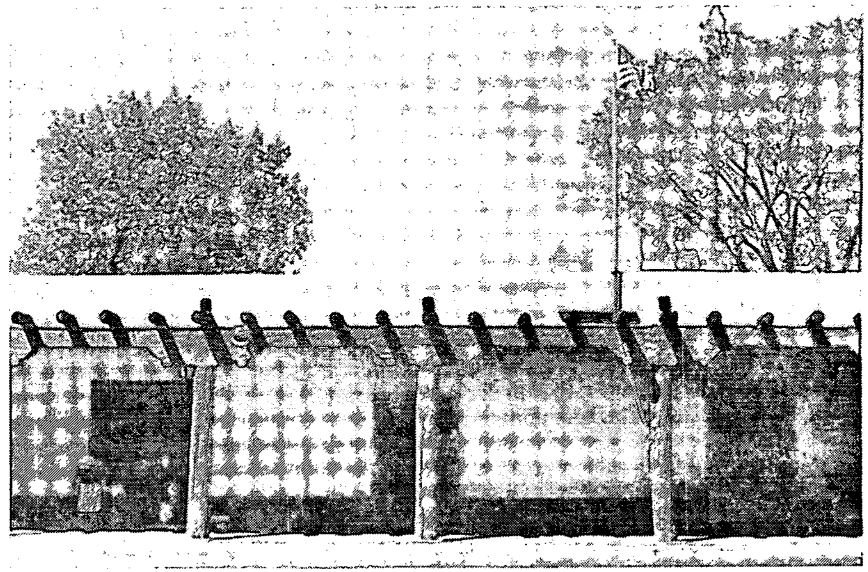
16A



16B

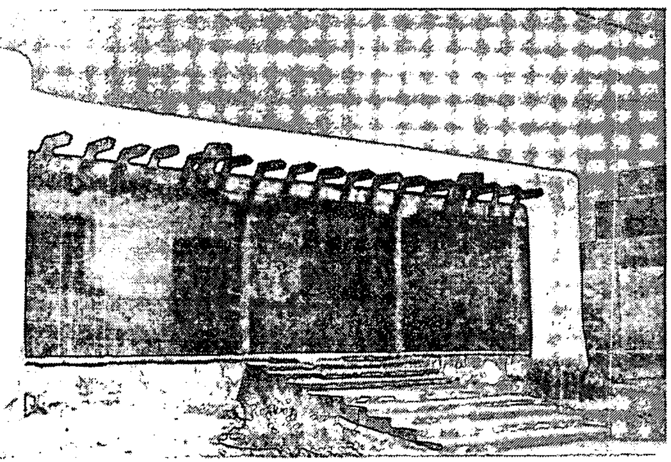


16C



16D

16A
Kiva
16B
Oldest House
16C
Hodgin Hall
16D
Governor's Palace



16E
Academic Building

TRANSITION AT THE UNIVERSITY OF NEW MEXICO

Long-range development and project planning problems at the University of New Mexico, are interesting in their own right because the University is located in a region of great population growth. The school's unique style of architecture and the matter of design transition however are especially worthy of note.

The University's importance in the history of campus design began with the appointment of Dr. George William Tight (1901) as president. Tight's influence on the campus design was immediate and pervasive. Though the institution had less than a hundred students, he sketched out a long range plan for a large increase in enrollment. He discovered water on the site and started an ambitious tree planting scheme, importing squirrels from Ohio for his "Little Forest." Tight's major contribution, however, was his recognition that "red brick was for the green East,"[1] and that campus architecture in New Mexico should be based on regional models.

In selecting an appropriate style of architecture for the campus, Tight was impressed by what he saw during his travels throughout the state. Because wood is in short supply, and the climate is arid with hot days and cool nights, the native architecture in New Mexico is expressed in earth buildings with thick walls, seldom more than two stories high. This is a highly malleable type of architecture; as seen even in the primitive buildings such as the kiva at the San Domingo Pueblo, just north of Albuquerque; or as adapted by the early white settlers and exemplified in what is said to be the oldest house in the United States. The Spanish hacienda, which is indigenous to architecture in the Southwest, also apparently influenced the early campus building designs; see photos of the Palace of the Governors in Santa Fe (reconstructed from original plans) and one of the first classrooms on the University campus.

Dr. Tight, aggressively campaigning for a regional style in new campus buildings, was rebuffed time and again by the regents. The faculty also rebelled, stating that "if you were going to be consistent, the President and Faculty should wear Indian blankets around their shoulders and feathered coverings on their heads."[2] But Tight would not be deterred.

He aroused enough interest among his students that a fraternity house was built as a kiva; and finally he personally led a volunteer group, trowels in hand, to the school's first buildings, and transformed the red brick Victorian Gothic structure into a reasonable facsimile of what Tight called the Pueblo style. (See photo Hodgin Hall.) These *de facto* actions, while accomplishing the aim of establishing a regional mark on the school buildings, again brought him into disfavor with the regents and ultimately he was forced to resign.

Subsequently, regents and architects found Tight's philosophy quite acceptable. Nine years after his resignation, plans were made to place the entire campus in a single pueblo-like structure (plans were cancelled, however, due to World War I). But the policy of the pueblo style was confirmed several times during the 1920's. When John Gaw Meem was appointed architect to the University in 1932, the school began a thirty year period of constructing major buildings in the local idiom. (See photos: detail of Administration Building circa 1935, and detail of Memorial Chapel, 1961.)

Not only was the regional architecture accepted on campus, but Tight's ideas became a "success d'estime" elsewhere, especially among institutional clients in Santa Fe, where the pueblo style has stifled almost all other approaches to architectural design. Photos, New Mexico School for the Deaf, 1930 period; Fine Art Museum of New Mexico, 1940 period, and the First National Drive In Bank, 1960 period.

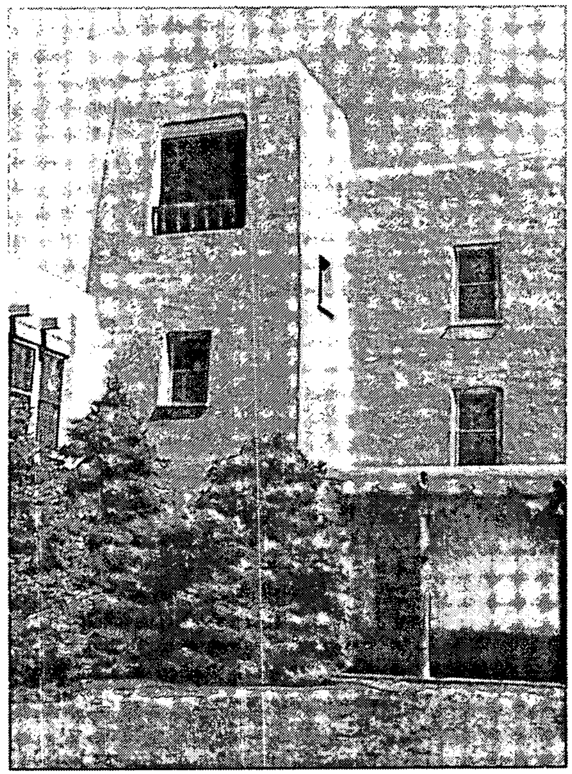
232

Like any historic idiom (for that is what the pueblo style became), the original strengths of its character became dissipated with changes in building technology. Designers were unable to solve new architectural problems with old forms. Each succeeding building became a pale imitation of a predecessor. This enervation could have been compensated for, had other aspects of campus design been strengthened; but under the impact of the hectic growth that followed World War II, the overall campus design fell apart.

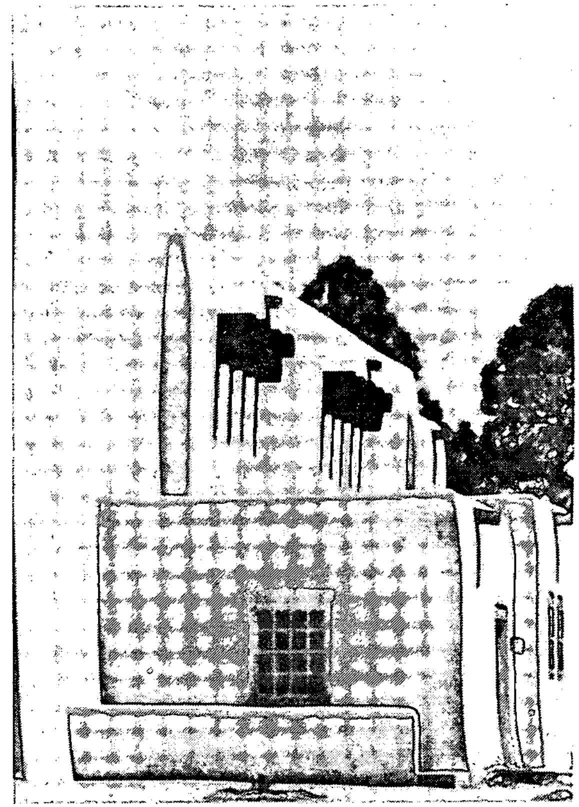
The illustrations are typical of many campuses caught between emotional attachment to the past and lack of direction for the future. These photographs were taken by the author on the New Mexico campus because they exemplify some basic themes in this book. The University had initiated important first steps towards improving its campus long before the author thought of using it as a case example. While critical, the captions are constructive, as indicated by the following pages showing how steps were taken to resolve the problems.

FOOTNOTES

1. Hughes, Dorothy; "Pueblo On The Mesa"; University of New Mexico Press; 1939.
2. *Ibid.*
3. Chapter 7.

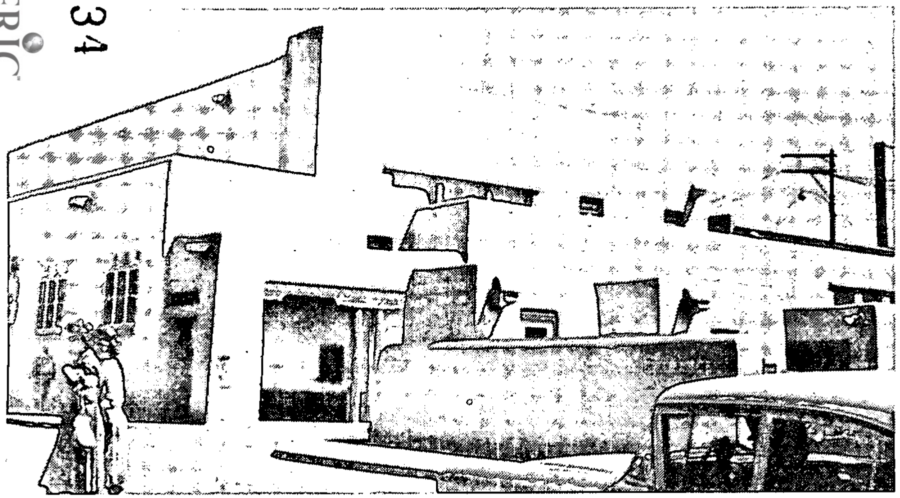


17A



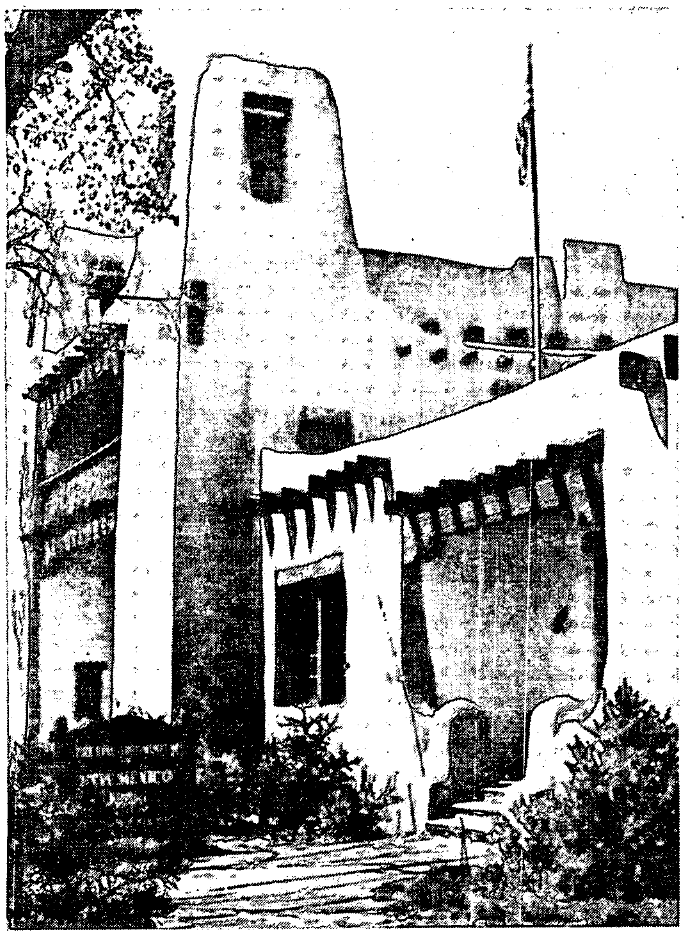
17B

17A
Administration Building
17B
Memorial Building

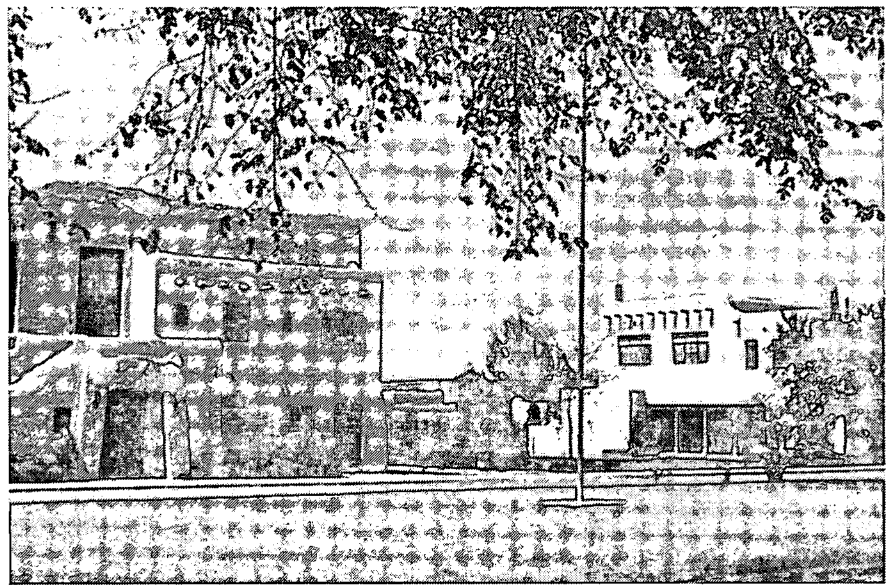


18A

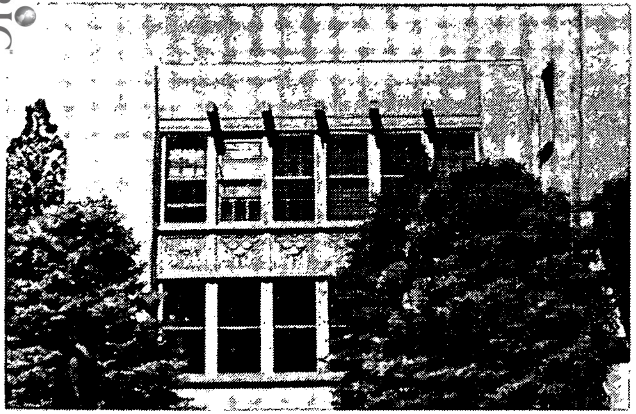
18A
Drive-in Bank
18B
Santa Fé Museum
18C
School for Deaf



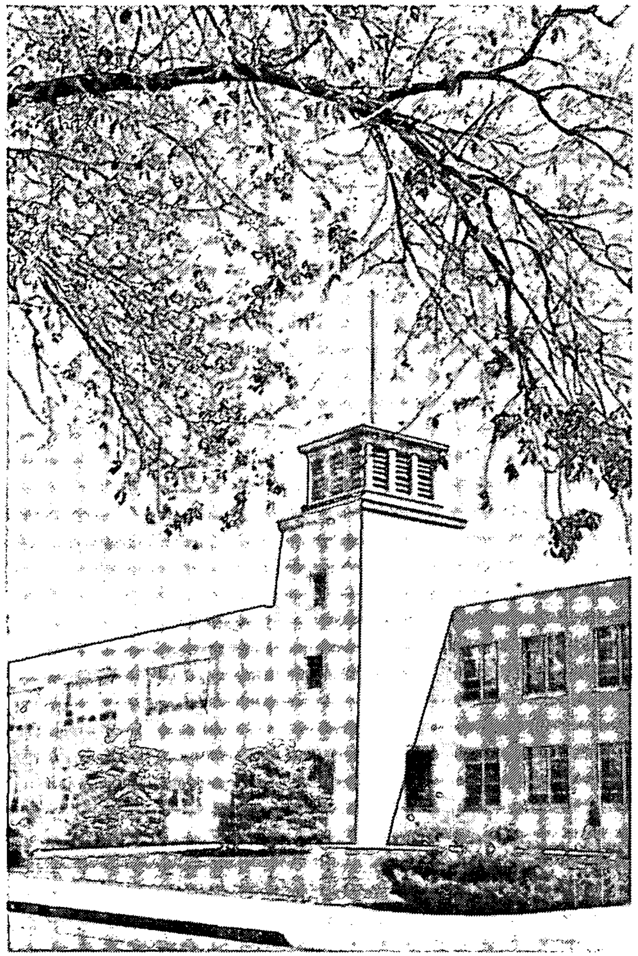
18B



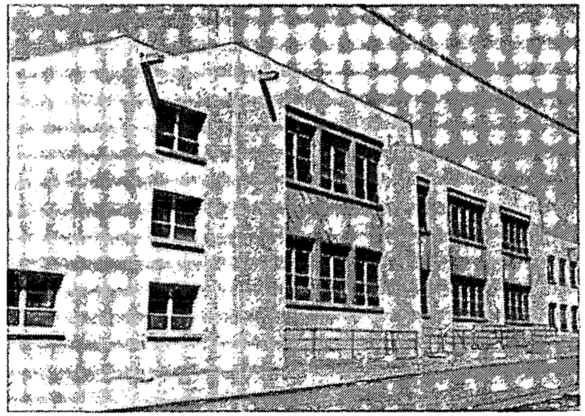
18C



19A



19B



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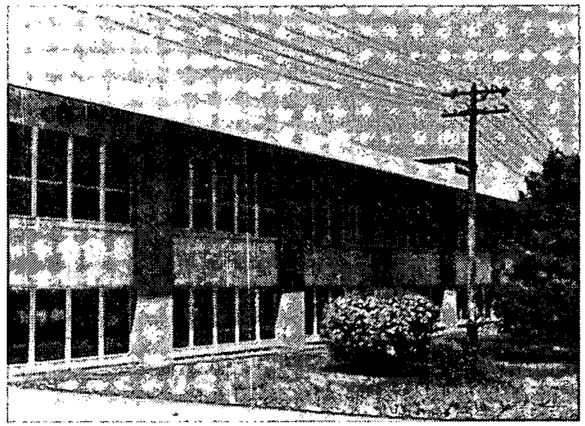


19D

The process of dissolution of historical styles seems to be invariably accompanied by a breaking down of sensitivity in all aspects of the building design, including detailing and siting. The gradual decline of the Pueblo style on the University of New Mexico campus is pictured from left to right across this page.

19A

Administration Building

19B

Lecture Building

19C

Science Building

19D

Engineering Building

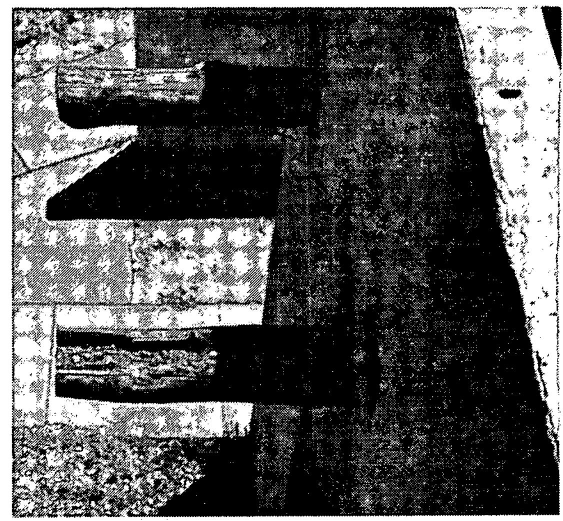
The materials of handicraft styles of campus architecture cannot be easily maintained. What was once quaint becomes visually distressing. The wooden details and the hand plastering of the first Pueblo style buildings on campus, shown in photos, indicate the difficulties an institution faces under such circumstances.

20A

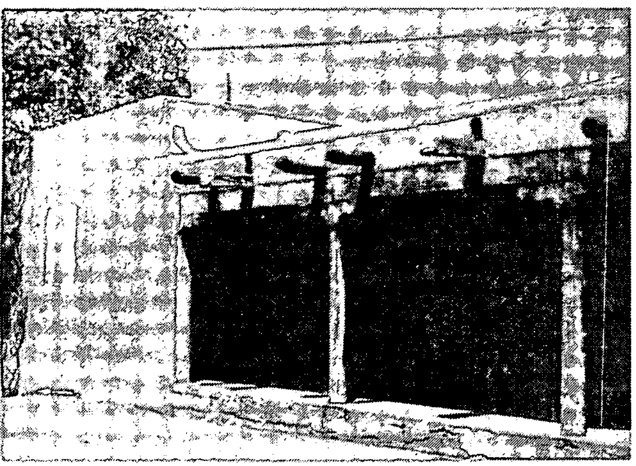
Maintenance Problem 1

20B

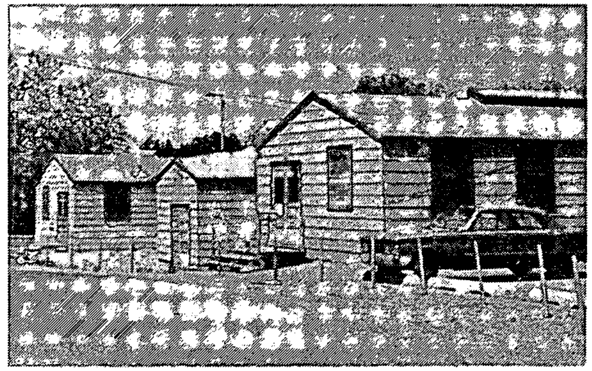
Maintenance Problem 2



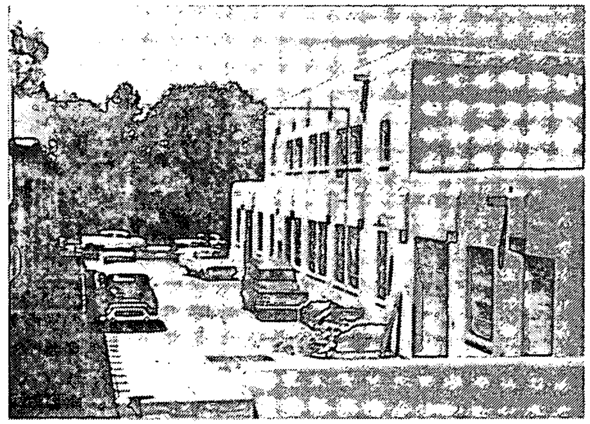
20A



20B



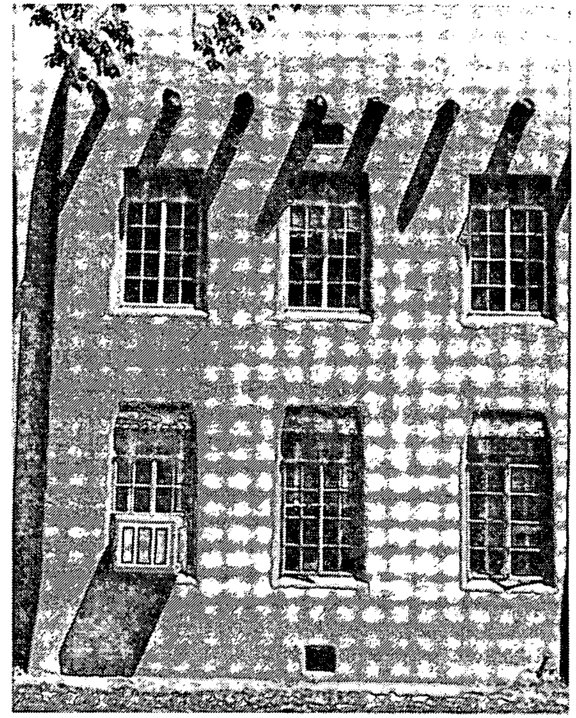
21A



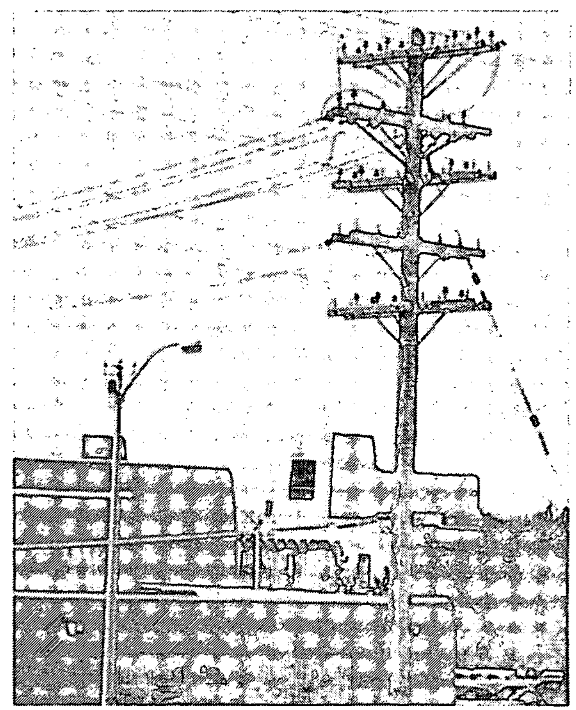
21B

The campus design deteriorates as temporary buildings are needed to accommodate continuing surges in enrollment; the automobile makes its incursion; new technical devices make older buildings seem anachronistic; and short-range measures taken to service the new growth clutter the campus scene. The visual effects these events had on the New Mexico campus are illustrated in the photos.

21A
Temporary Building
21B
Auto and Service
21C
Anachronism: Air Conditioning
21D
Campus Clutter



21C



21D

The University of New Mexico
Albuquerque, New Mexico
Co-educational
Public
Spring 1962 enrollment: 7,707
The General Development Plan — 1960
Prepared by:
John Carl Warnecke and Associates
Lawrence Lackey
Alfred W. Baxter, Jr.

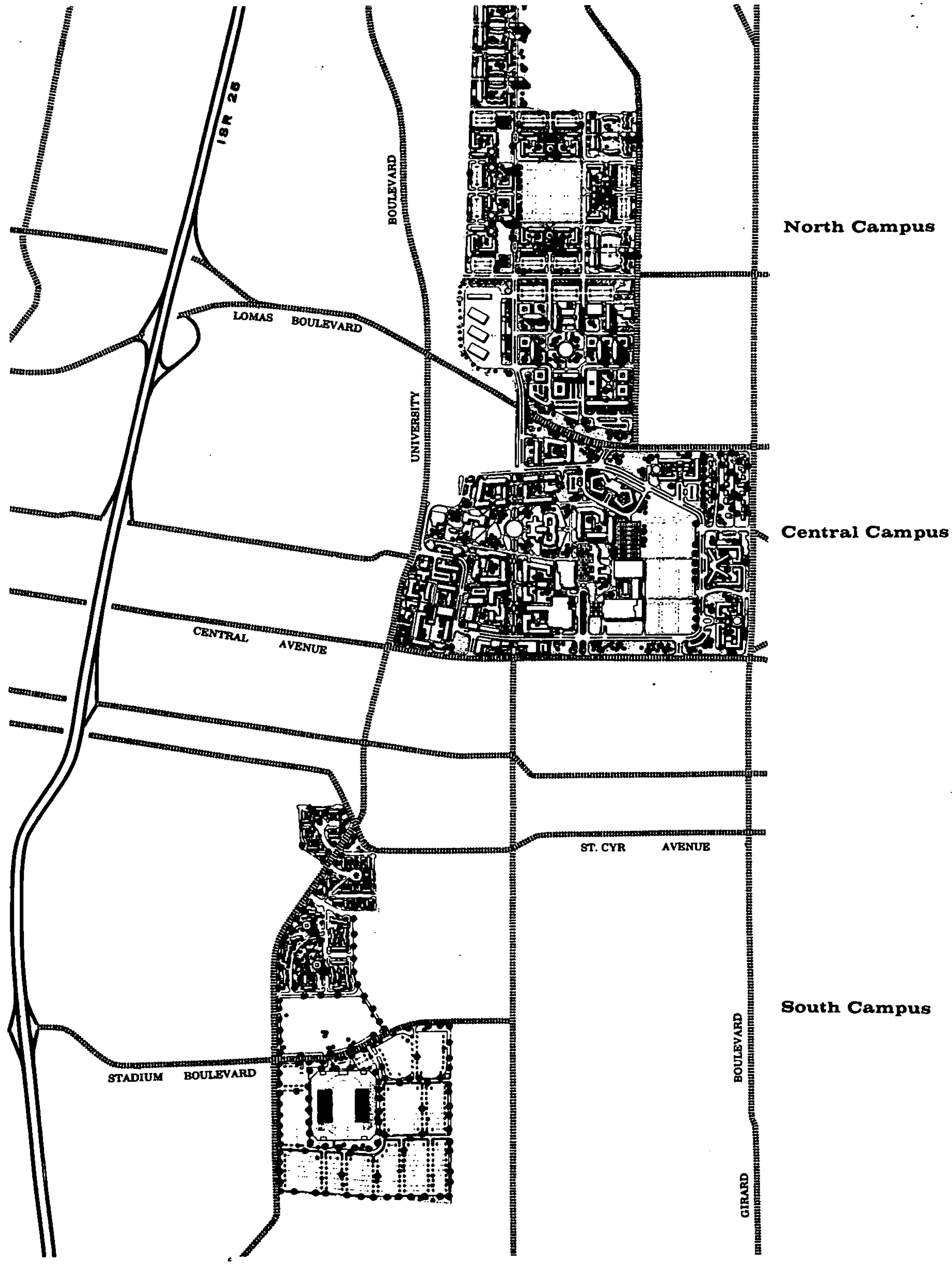
22

The General Development Plan
for the campus of The University of New Mexico

Planning for the orderly growth of a University requires a continuous process of institutional analysis and self-study. The plan summarized two years of study and analysis by the Regents, administrative officers, faculty committees, the planning consultants, and others concerned with the future of the Albuquerque Campus. This intensified planning process was initiated in the Fall of 1958 as the University faced increasingly complex decisions regarding long-range capital budgeting, site selection for campus buildings, land requirements, and related fiscal and administrative problems.

Few institutions are changing as rapidly as the modern state university. In the Western states, rising birth rates, substantial migration, and increasing demand and need for advanced education are pushing collegiate enrollments to unprecedented levels. In view of these circumstances, the General Development Plan was formulated to accommodate an eventual enrollment of twenty-five thousand students. This level of enrollment was suggested as a practical maximum administrative unit in consideration of local conditions and experience accumulated by other major universities.

The Plan is predicated upon academic expectation and programs related to local and regional needs. It proposes ultimate and proximate goals, and sets forth a set of directions for reaching the goals starting with the resources of the existing campus. It is general and is flexible. Elements can be altered without changing completely the basic organization and structure.



)BLEMS AND SOLUTIONS

Population studies in 1958 indicated that the University would grow at a faster rate than that suggested in the 1955 Meem plan; as a result, another long-range plan was prepared in 1960. This was based on a maximum enrollment of 25,000 students. It is expected that registrations would reach the 18,000 mark by 1970.

The 1960 plan will do much to restore and revitalize the design structure of the campus, as well as afford a guide to long range development. The problems of design content, illustrated on page 229, are being resolved in several ways.

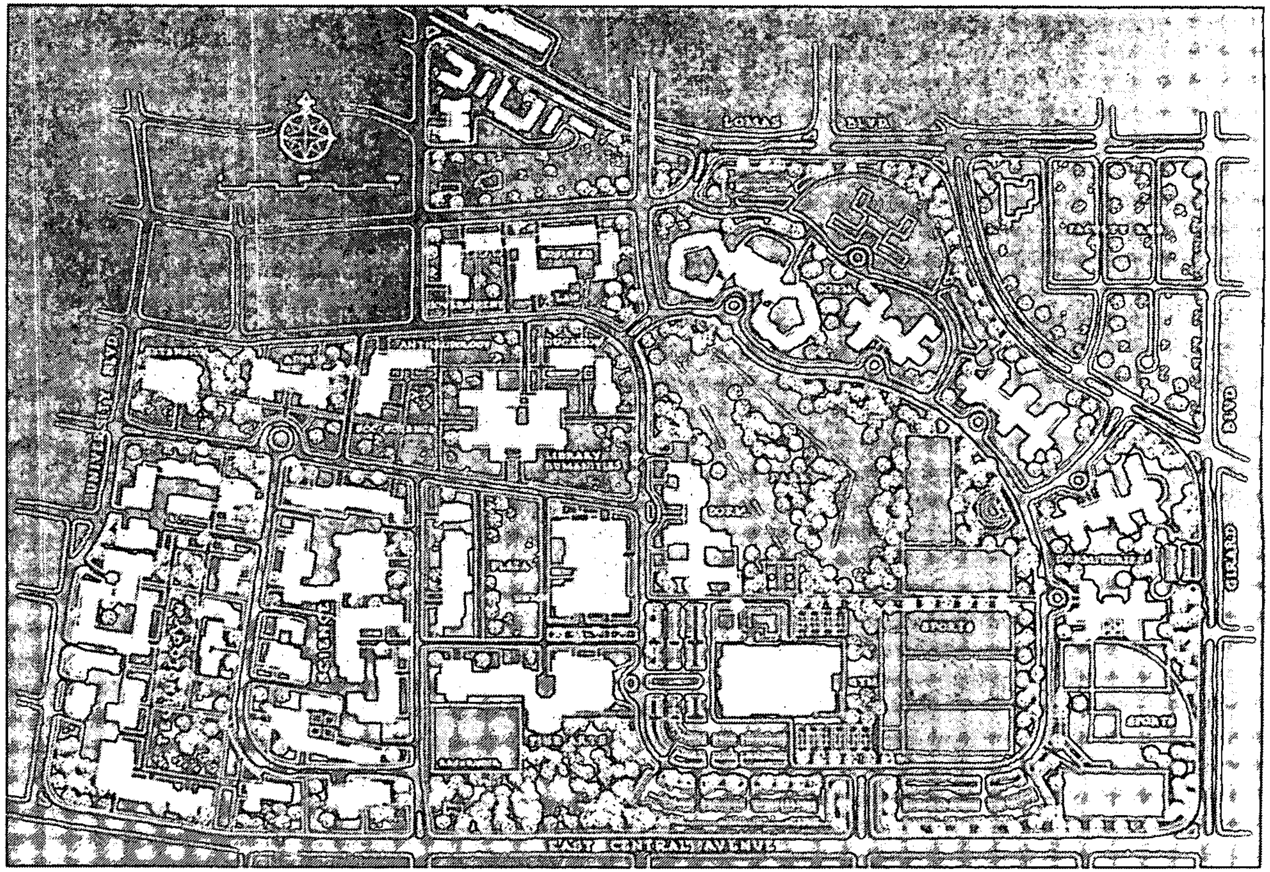
The University has appointed the firm of Eckbo, Dean, and Williams as landscape consultants, to be responsible for coordinating the design and location of all future site improvements such as utilities, walks, lights, sprinklers, plant materials and street furniture.

In accordance with the Warnecke Plan, streets inside the central campus area will be closed to through traffic and replaced with ten foot wide pedestrian walks, which will also carry service and emergency vehicles. A unified pedestrian system will replace the present patchwork of sporadic and unrelated improvements. Under a long range site improvement schedule, utilities will be placed underground, and design standards will be established so that such elements such as bicycle stands, benches, hydrants, enclosures, and screens will be visually unified.

The greater use of water on campus, suggested as a design theme in the development plan, is similarly being explored. Implementation depends on how well such conditions as algae growth in fountains can be controlled (the growth is accelerated by the heat and sun of the climate). There is also the problem of dust deposition due to the dry winds of the desert; and that all too common problem, the "litterbug."

Since it lies between desert and mountains, the landscape architects will be able to contrast handsome native desert plants (see photo below) with highly developed green areas. Continuous belts of Ponderosa Pine will be used to emphasize the major pedestrian paths; due to the fact that many non-desert tree species are short-lived in the Southwest, a rotating replacement program will be established. Rocks of various sizes, from pebbles to boulders, will be added to the design palette — the latter in groups to control circulation as irregular, raised planters and as sculptural groups in relationship to architecture or garden spaces.

23
Landscape, University of New Mexico Library Courtyard



24
John Gaw Meem Plan (1955)

Benefits of Earlier Planning

Some of the benefits of earlier planning should be noted so that the value of the planning process can be appreciated even though the full scope of the developments proposed in earlier plans was eventually changed by altering circumstances:

1. The suggestion that building groups be established and devoted to related academic departments; e.g., the Sciences group, the Technology group, etc.

2. The site selected for the Library, which will become increasingly central as the center of academic gravity shifts to the east, and the generous spacing of buildings in this area of the campus.

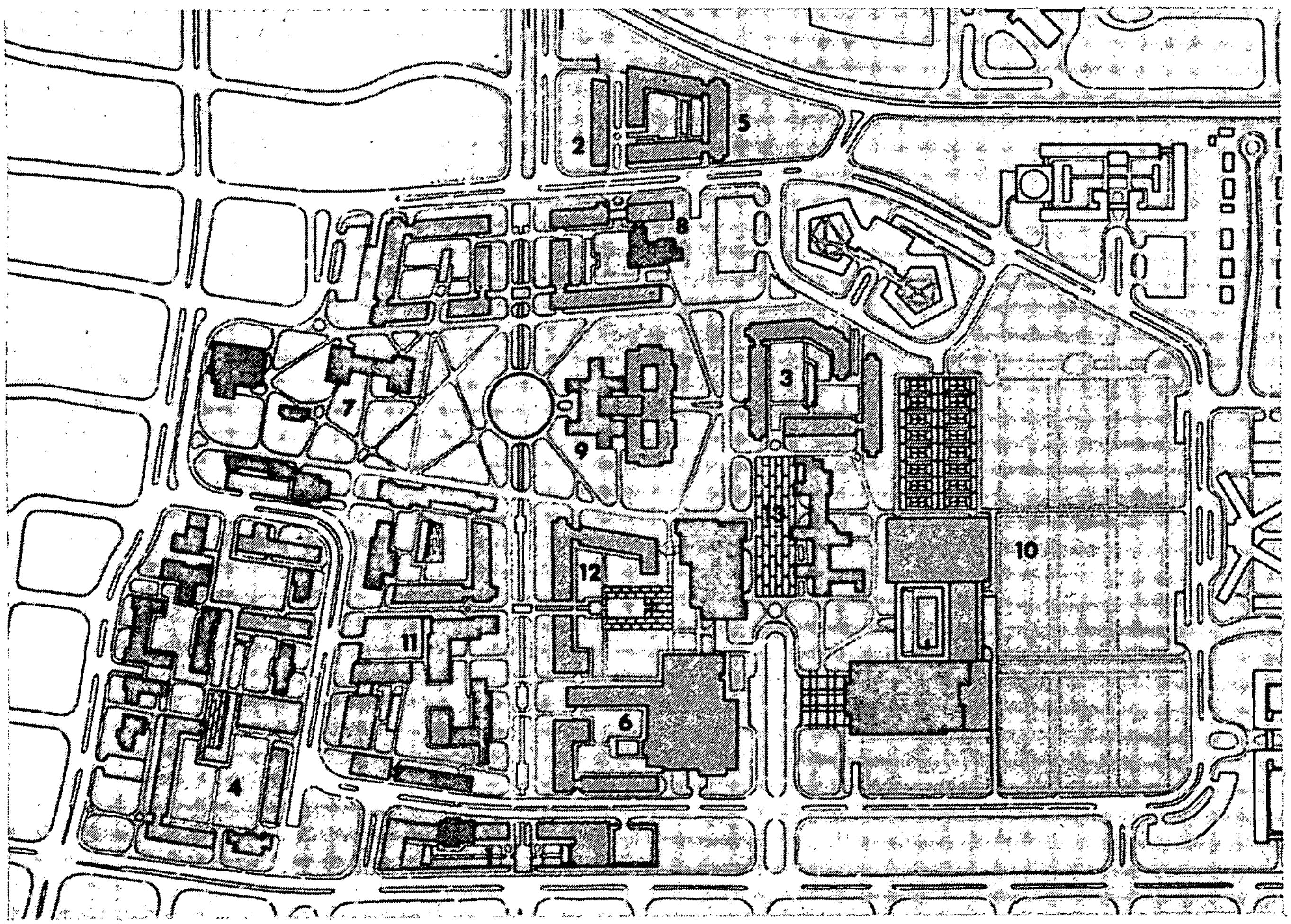
3. The location of instructional athletic fields between the gymnasia and single student housing areas at the eastern edge of the campus.

4. The University now has sufficient land for growth to an enrollment of 25,000. Much of this land was acquired as a result of planning foresight long before there was a pressing need for it. Interim use of the land, as for the golf course, was of benefit to the University and to the Albuquerque community.

5. The continuing use of a single architectural style has given the Central Campus a distinguishing unity of character.

6. Valuable open areas have been reserved for athletic use and for future expansion.

7. Recent student residence halls have been located at the edge of the Central Campus, rather than toward the center, preserving this valuable core area which will be needed for academic expansion.



25

Central Campus Plan (1960)

This is a synthesis of three stages of growth. The dark buildings are those existing facilities which will continue in use; the lghter buildings are those which are necessary to accommodate a 16,000 student enrollment, and a 25,000 student enrollment. Buildings not already in the preliminary architectural stage are schematic, and indicate approximate location and ground coverage.

Principal design features:

1. Central campus is free from through traffic.
2. New and old buildings are grouped to form a series of courts, linked by the pedestrian circulation system.
3. A major public open space is to be established near the Main Library. A reflecting pool serves as a focal point, connecting the major north-south pedestrian malls, which in turn link the three campuses. In the fashion of the Moorish gardens, a narrow formal watercourse will run through the mall.
4. Optimum capacity for academic use in the central campus is to be achieved by constructing new buildings to the limit allowed by land coverage criteria of 25%; new buildings are to be three and four stories high, raising the average story height to two and a half floors throughout the campus; departments and activities having low priority on central campus space will be moved to the periphery.

1	Administration
2	Business Administration
3	Education
4	Engineering
5	Extension Division, Bureau of Business Research, etc.
6	Fine Arts, Architecture
7	Humanities
8	Law
9	Main Library
10	Physical Education
11	Physical Sciences
12	Social Sciences
13	Student Services

EVOLUTION IN THE REGIONAL STYLE
College of Education Building (1962)
University of New Mexico
Architects: Flatow, Moore, Bryan and Fairburn
Landscape Architects: Eckbo, Dean and Williams

Here, site location and orientation of main entrances and service areas were made to conform with the 1960 development plan. (Compare plan with page 233, above.) Note the change in the planning module as the project moved from a long range site commitment to a specific building design.

Today, functional problems in architectural design at any university must allow for:

1. Changes in curriculum and instructional methods which make it necessary to plan for a greater variety of building spaces, many with special interior requirements as to fixtures and equipment. Interior spaces must have flexibility for easy modification and rearrangement.
2. Changes in scale of buildings. Multi-unit complexes are being designed in place of the free-standing single building. (Compare the sizes of the early university buildings shown in the southwest quadrant of the University of New Mexico campus plan, page 233; with the newer facilities in the west and north quadrants.)
3. Interior technical requirements such as economic air conditioning, heating, ventilating and lighting, which must be carefully integrated in the buildings.
4. Economical structures and construction techniques must meet the rising building costs. The need for simple maintenance must be recognized in selecting materials.

In addition to these general conditions, architecture at the University of New Mexico must also solve the problems of:

1. An unusual climate, with strong solar radiation.
2. An attachment to architectural tradition which reflected the region well at one time, but which is increasingly difficult to maintain in view of the functional changes described above.

In designing the College of Education Building, architects and university together have reached a solution which compromises neither program, contemporary architectural standards, nor tradition.

For a contemporary design solution reflecting the regional style, the architects (and this is the author's conjecture) could have turned to a sculptural concrete, similar in mood to the work of Saarinen at T.W.A. and of Le Corbusier at Ronchamp. See photo right, detail of existing Administration building at University of New Mexico; detail of Ronchamp. However, the execution of such designs requires consummate skills; this is not to suggest that the architects were lacking, but simply to suggest one possible alternative.

The actual solution was more architectonic than plastic. The highlights of the final design which intelligently solved the problem of transition were:

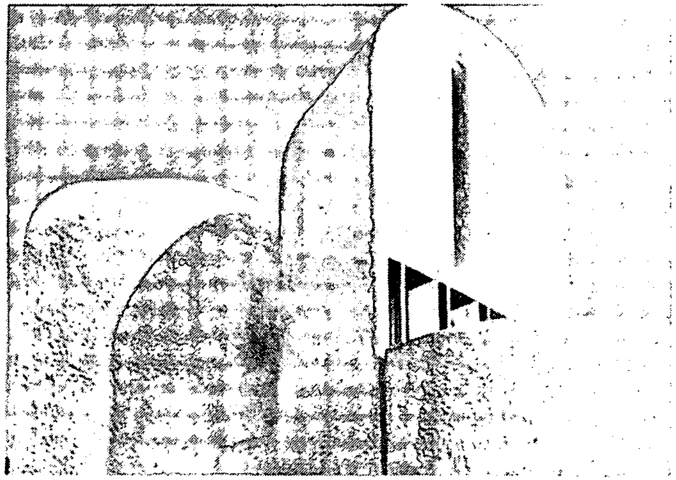
1. An organization of buildings and open spaces which broke down the large structural mass into a series of smaller units facing inward on a communal area. This space-organizing quality is similar to the site disposition of background and foreground buildings in the Indian Pueblo. (See photo right.) The seminar room for example, is, without being romantically literal, a descendant of the kiva.
2. Low lying buildings with flat roofs, sloped walls, rectangular faced masses, which will be evocative of the earlier buildings.
3. The limited use of exterior glass, chiefly to the north sides of the buildings, thus overcoming glare and reducing heating and cooling loads. This aids in maintaining the outward solidity of the building facades by reducing the amount of fenestration.
4. Pre-cast concrete units and other surface materials of earth type colors, to match the existing buildings.
5. Non-architectural elements, such as plant materials, paving, walls and other elements, to reflect but not imitate regional prototypes.

FOOTNOTES

1. Hughes, Dorothy; "Pueblo On The Mesa"; University of New Mexico Press; 1939.
2. *Ibid.*
3. Chapter 7.

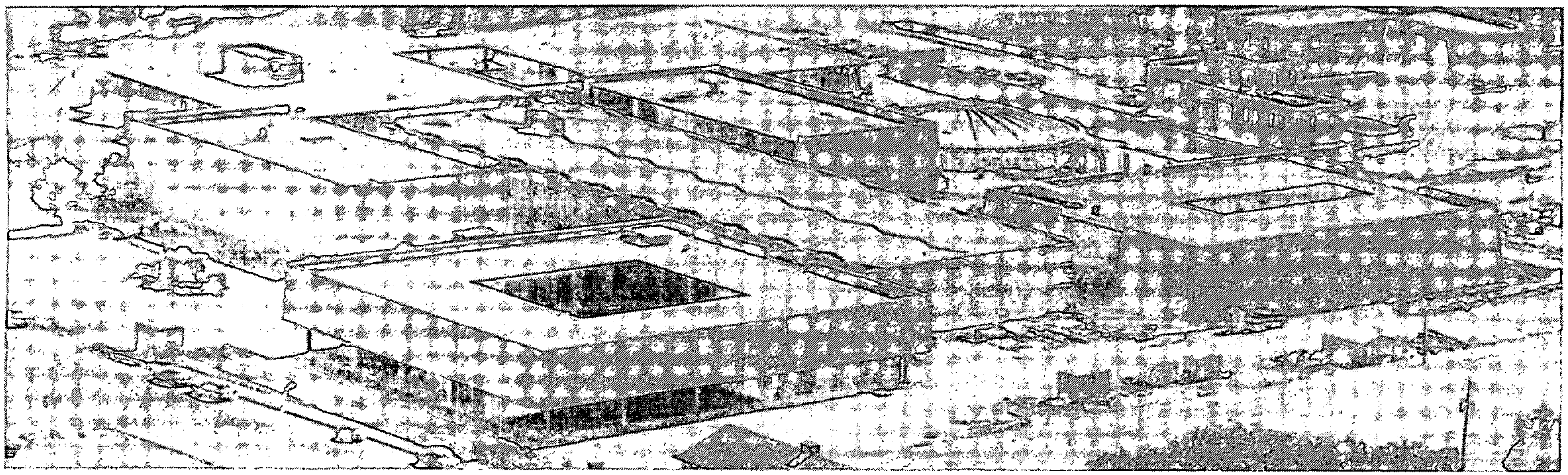
242

26A
Detail, Ronchamp Chapel
Architect: LeCorbusier
26B
Acoma Indian Pueblo
AIR PHOTO: LIMBAUGH
26C
Construction
PHOTO: MELESKI



26A

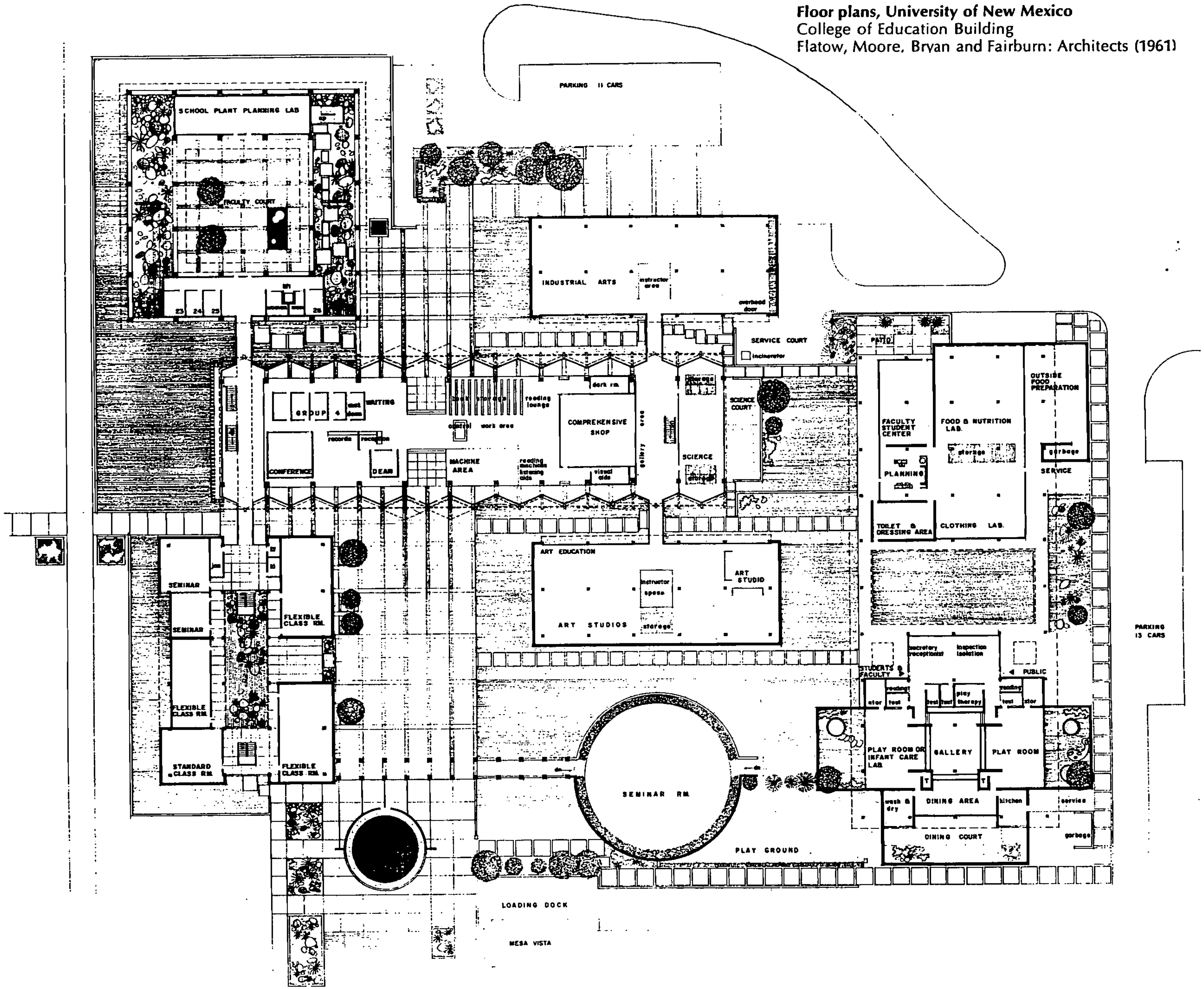
26B



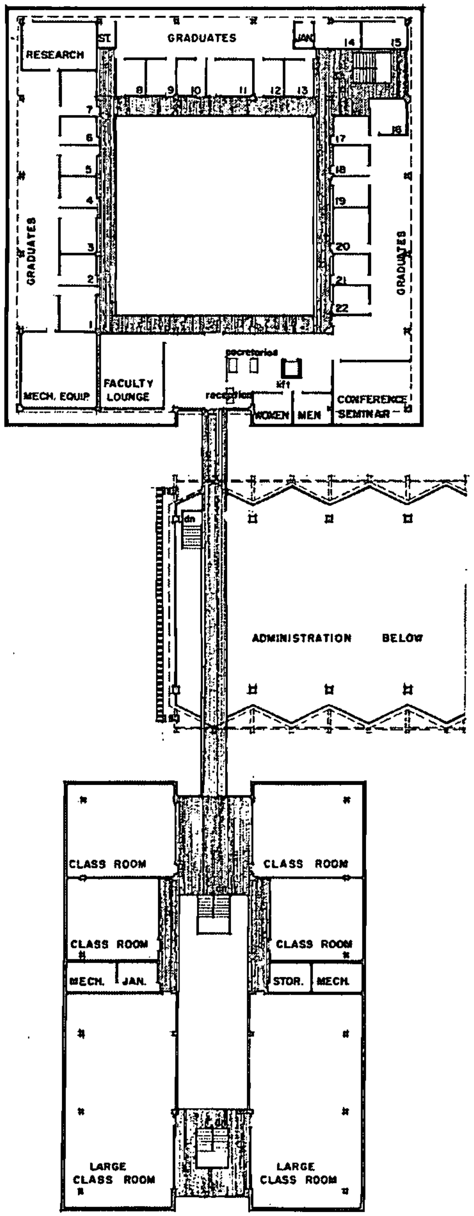
26C

27

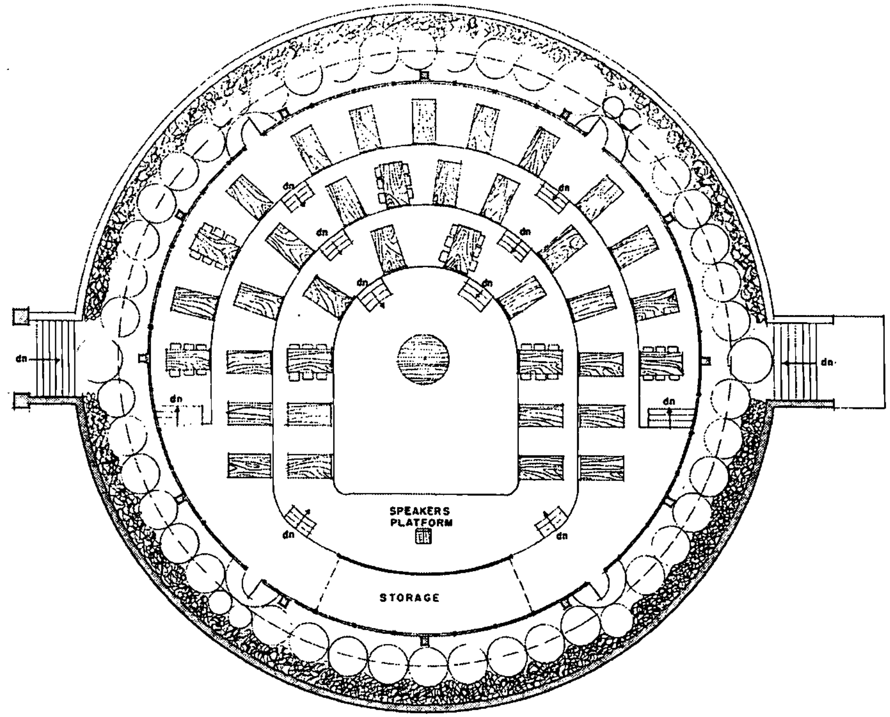
Floor plans, University of New Mexico
College of Education Building
Flatow, Moore, Bryan and Fairburn: Architects (1961)



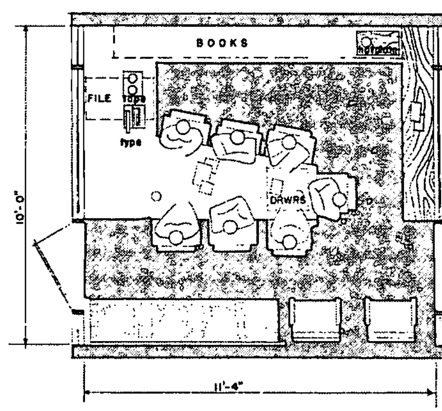
FLOOR PLAN 1"= 20'



SECOND FLOOR PLAN 1" = 20'

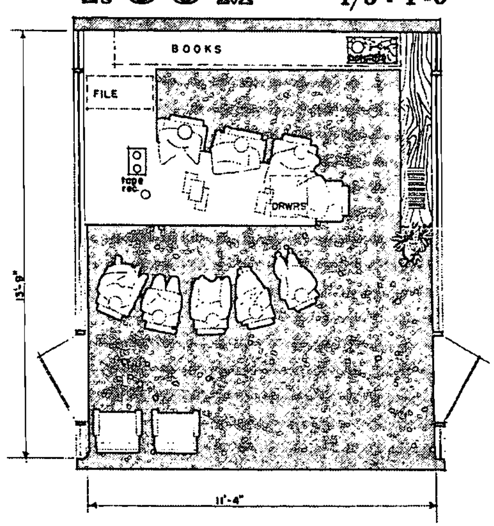


SEMINAR ROOM 1/8" = 1'-0"



TYPE "A" OFFICE

1/2" = 1'-0"



TYPE "B" OFFICE

6. A Selection of Development Plans

INTRODUCTION

In selecting general development plans to illustrate this chapter, I wish to accomplish two things. The first objective is to convey the full spectrum of campus planning as it is being practiced today, and in doing so suggest that there are important differences between architecture and planning. For much of what is labeled campus planning is not much more than project design, albeit in many cases excellent architecture and site design.

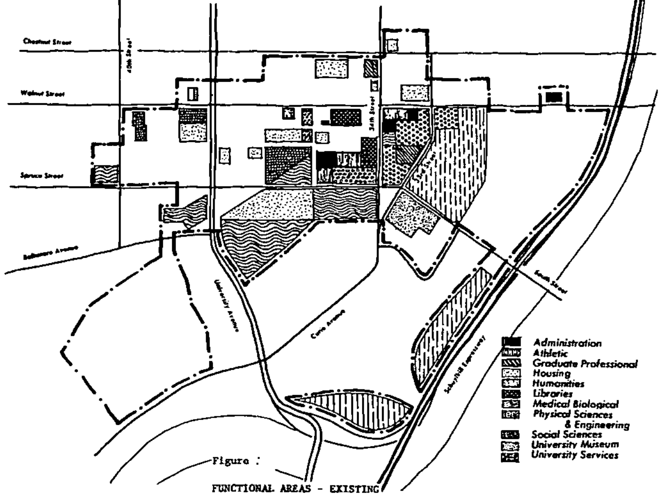
Architecture is an art of definitiveness and commitment. Though it may express its milleu and client, architecture is largely a personal art, as opposed to planning, whose art emerges from multiple participation. Architecture's contribution to the physical design of the campus lies more in the area of content (project design) than structure (planning). I am not concerned about architects' practicing planning. But in having architecture serve as a vehicle for establishing an appropriate overall campus form, its vitality is too often compromised because it cannot be a commitment through time.

On the other hand, planning's contribution to the total design process must be more than an articulation of programs, clarification of goals, evaluation of alternatives, and the engineering of consent. Planning must suggest an appropriate comprehensive physical form for the goals by tying the many parts of the campus into a singular and distinctive entity, and simultaneously accommodate provisions for change and adjustment within that entity. *Being* and *becoming* best describe the design which is planning.

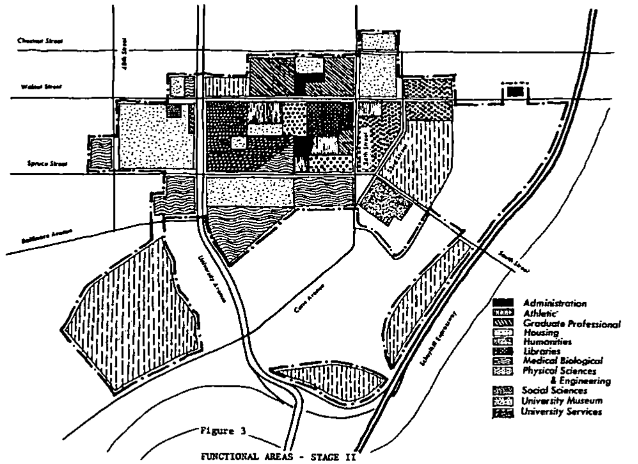
Planning, like architecture, has a critical weakness. Good programming does not necessarily insure a good design. The opposite is also true. The examples selected in this chapter also represent the spectrum of current practice in both these respects.

The second and more obvious objective is to illustrate many of the ideas and procedures previously described, as they appear in a single planning venture.

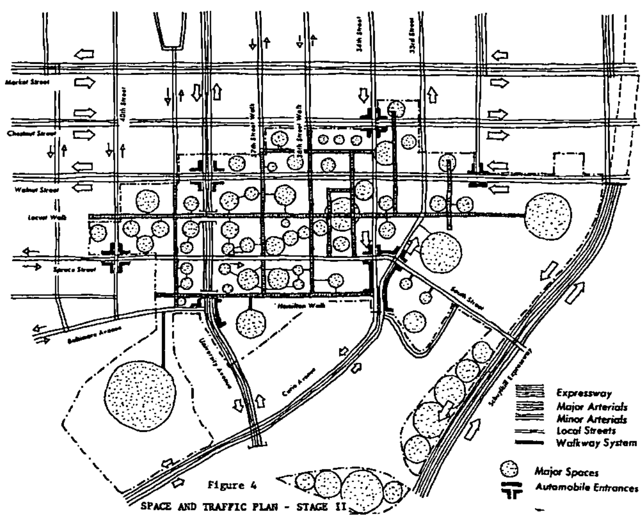
I have already indicated that the application of comprehensive planning techniques to the campus is rather recent. Unfortunately a number of significant planning efforts cannot be included in this book because they have not reached the stage of synthesis where they can be published as general development plans. I have in mind the work being done at Stanford University, the University of Colorado, Brown University, the University of Massachusetts, the University of Wisconsin and the University of California.



1A



1B



1C

1
University of Pennsylvania (1961)
Philadelphia, Pennsylvania
Co-educational
Private
Spring 1962 enrollment: 17,927
University of Pennsylvania Development Plan—1961
Prepared by the University Planning Office

This plan, one of a series of continuing studies, is intended to guide physical development at the University in order to accommodate an enrollment of 26,000 students expected in 1975. In accordance with the educational policy and objectives of the University, the plan establishes the general location of individual buildings, their estimated volume requirements, and their relationship to each other.

The major planning goals include:

1. The organization of pedestrian oriented campus.
2. The structuring of a cohesive land-use plan, incorporating many of the existing buildings, and using urban standards of development—an overall building coverage of 50 per cent and a floor area-site area ratio of 150 per cent.
3. The minimization of through vehicular traffic, with vehicular and pedestrian traffic separated at the critical points of juncture.
4. By 1970, the housing of every undergraduate in a unit that is either owned or supervised by the University—i.e., a dormitory in the University housing system, a fraternity or sorority, or the home of the commuting student.
5. The fostering of a university-related community in the environs of the campus.

See 1A, 1B, the eleven functional areas on the existing campus, and how they would be arranged structurally at the end of the plan period. The important "chess-board moves" are:

1. Student oriented administrative services will continue in a central location; other business and staff functions will move to the periphery.
2. Existing athletic fields will continue in place and a major new facility will be developed in the undergraduate housing area to the west.
3. A major graduate-research center is proposed in the northern quadrant of the campus; in addition a block just east of it will also be developed for graduate work, these uses being placed close to the University and Graduate libraries.
4. Existing housing in the center of the campus will continue in use, and new housing will be located around the periphery.
5. Humanities will continue to be developed in the central campus.
6. Medical-biological activities will continue to expand in present locations.
7. Physical sciences and engineering will continue to expand in their present location. A Physical Sciences research area may be located on air rights over existing railroad trackage, upper northeast quadrant.
8. Social Sciences will expand to comprise a major portion of the western quadrant in the central campus area.
9. University Museum will expand on its own site.
10. Selected University services will be relocated to allow for academic expansion in the central area.

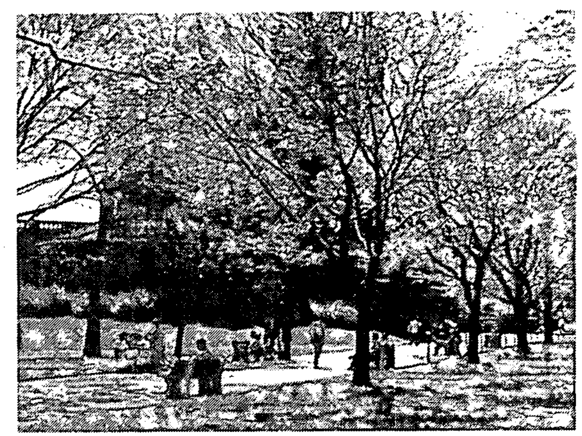
1A
Existing Functional Areas
1B
Functional Areas—Stage II
1C
Space and Traffic Plan—Stage II

2A, B
Space and traffic plan

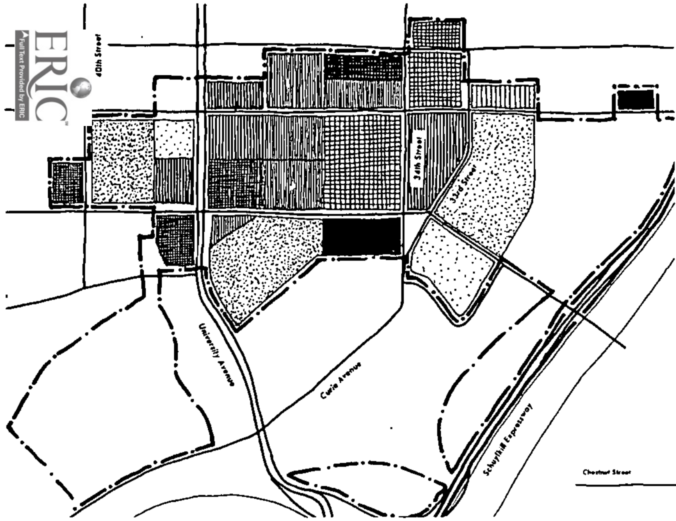
A number of individual city blocks will be pulled together into major superblocks, creating a series of campus sectors. These will be tied together by greenways and walkways. The closing of Locust Street, for example, will establish a major east-west pedestrian axis. As much as possible motor vehicle traffic will be separated from bicycle and pedestrian traffic by overpasses and underpasses. The circulation skeleton is manipulated to take advantage of transportation terminals serving the University; thus bus stops, subway kiosks, taxi-stands and off-street parking facilities become important terminal points in the internal circulation system.

The design flavor of the open spaces will range from the soft green lawns in the older sections of the campus to the more urbanized city-scape spaces, such as the plaza shown in front of the University's new School of Communications Building.

PHOTOS: LIBRARY WALK: JULES SHICK
ANNENBERG PLAZA: LAWRENCE S. WILLIAMS, INC.



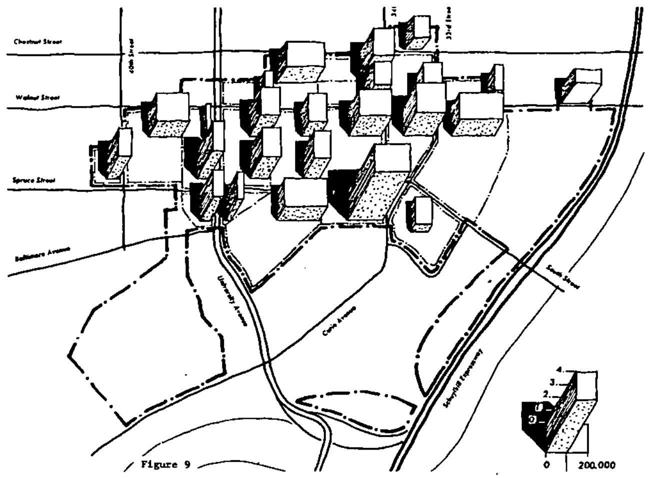
2A



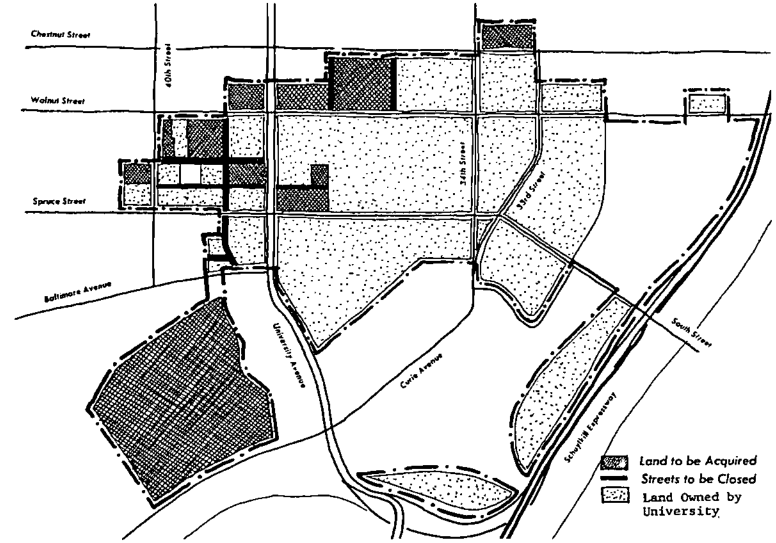
1D

1D
Building Coverage—Stage II
1E
Floor Area and Site Area Ratio—Stage II
1F
Land Acquisition Plan and Street Closing—Stage I

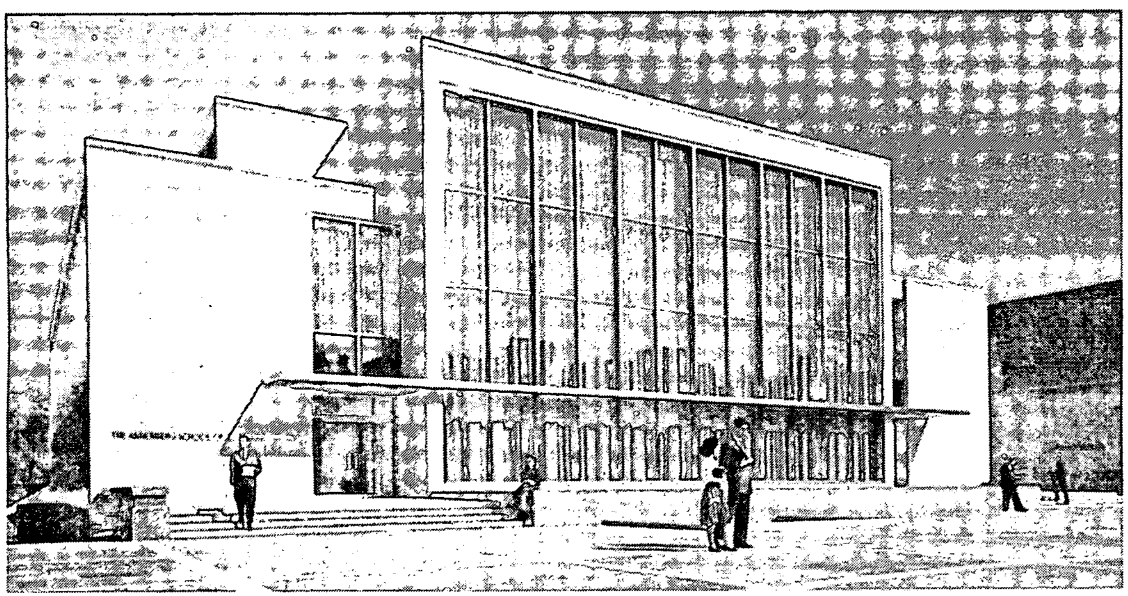
247



1E



1F



2B

3
Implementation

To control long-range design objectives it is necessary to establish design controls, so that each individual project begins to add to the whole. To give the greatest flexibility to the project designer the major controls in the University development plan are:

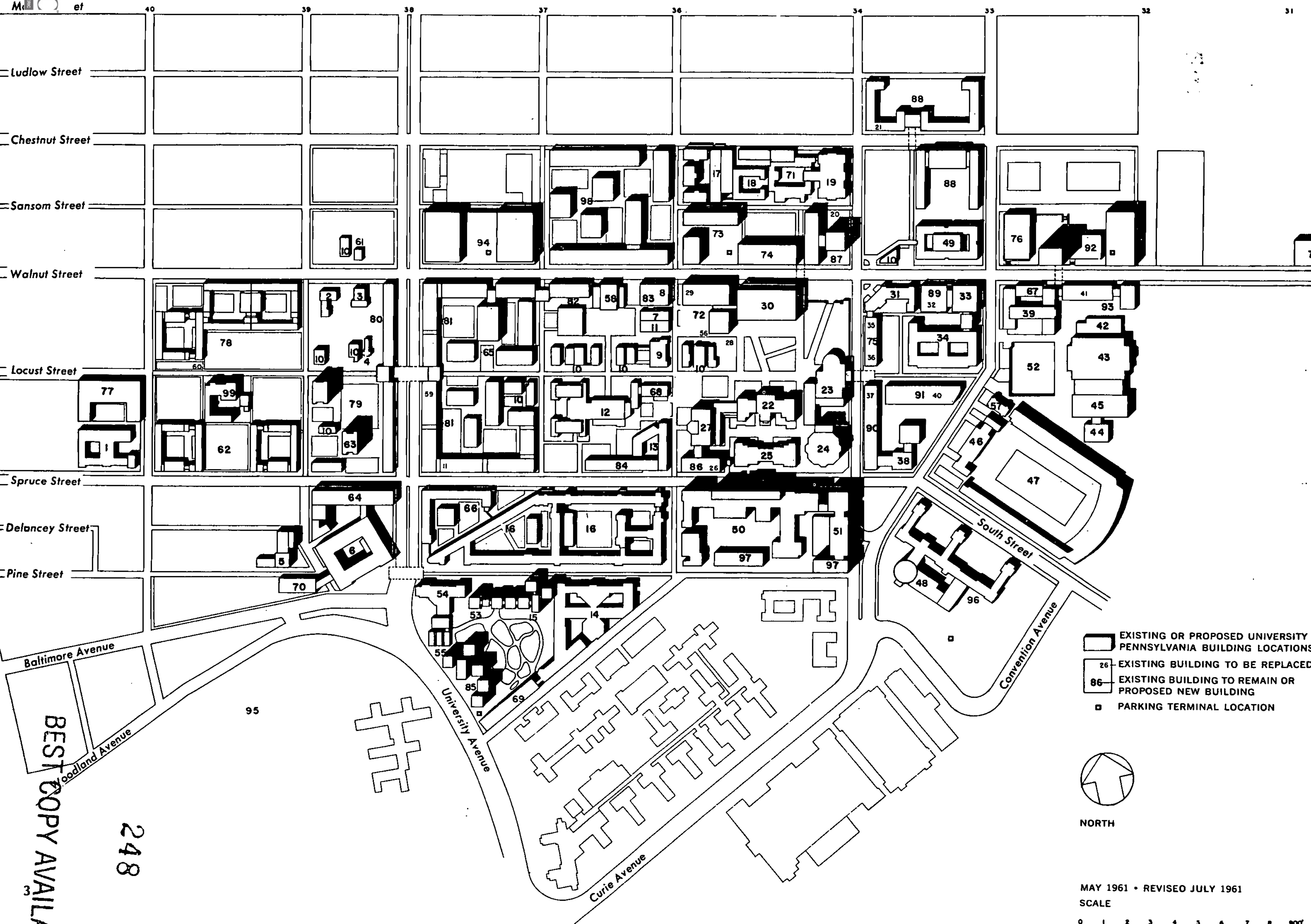
1. Land-use arrangement plan
2. Circulation and open-space structure
3. Density controls for each land use area.

The latter controls, shown above, include building coverage ratios and floor-area-site area ratios.

The implementation of the plan depends in part on expansion on land not presently owned by the University and the closing of local city streets. Because these steps occasionally involve lengthy discussions and involved procedures, the sequence of steps to be taken must be identified far enough in advance to allow alternate plans to be formulated, should the first choices in expansion be blocked by conditions unfavorable to the institution. The staging plan above indicates the measures which the University of Pennsylvania expects to take to accomplish its objectives.

Fortunately, the University is located in an area where long-range planning is held in high regard. As described earlier, pages 48 and 49, the institution is a member of the West Philadelphia Corporation, a local private group co-ordinating and guiding the participation of all local interests for neighborhood renewal, conservation and rehabilitation. As the University's expansion requirements are constantly considered against the light of the total local requirements, it is expected that a balancing out of any conflicting interests can be achieved over a period of time. Since the University planning is a continuing effort, the long-range goals can be adjusted to new conditions that occur from within the institution, as well as be adjusted to meet circumstances in its environs.

UNIVERSITY of PENNSYLVANIA DEVELOPMENT PLAN



248

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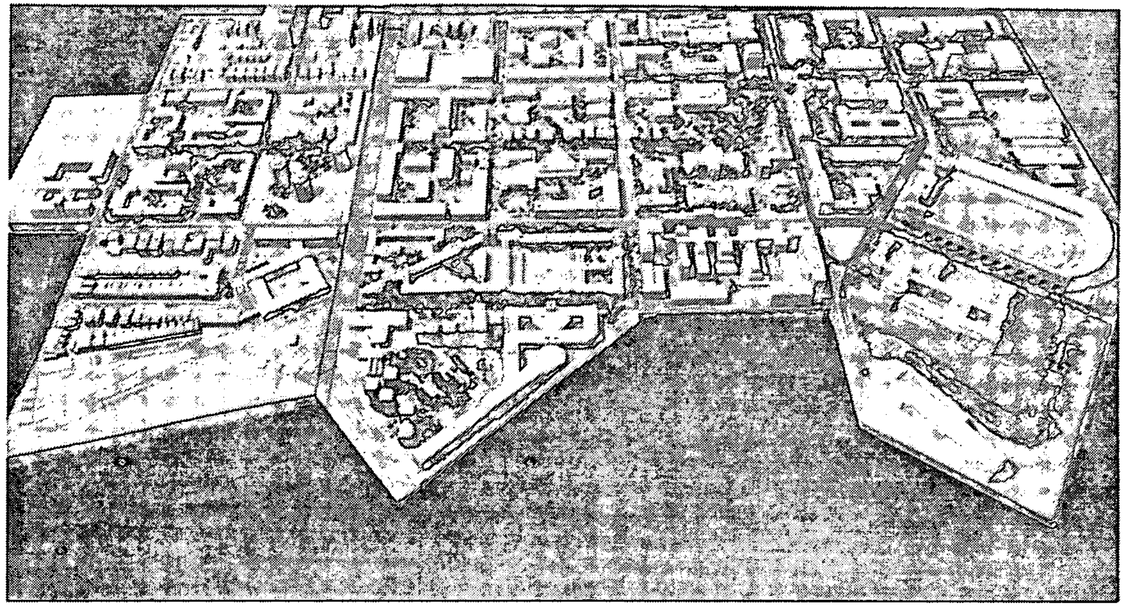
249

1. DENTAL SCHOOL
2. INSTITUTE OF STATE & LOCAL GOVERNMENT
3. PRESIDENT'S HOUSE
4. CHAPLAIN'S HOUSE
5. ALLIED MEDICAL PROFESSIONS
6. VETERINARY SCHOOL AND HOSPITAL
7. HILLEL FOUNDATION
8. FACULTY CLUB
9. CHRISTIAN ASSOCIATION
10. FRATERNITY HOUSES
11. NEWMAN CLUB — ORIGINAL REPLACED BY SOCIAL SCIENCES
12. DIETRICH HALL (WHARTON SCHOOL)
13. WISTAR INSTITUTE
14. SCHOOLS OF MEDICINE
15. MEDICAL RESEARCH BUILDING
16. MEN'S DORMITORIES
17. NURSES RESIDENCE
18. LAW SCHOOL DORMITORIES
19. LAW SCHOOL
20. POTTER — REPLACED BY GRADUATE CENTER
21. SERGEANT HALL—REPLACED BY WOMEN'S RESIDENCE HALLS
22. COLLEGE HALL
23. LIBRARY—NEW FINE ARTS SCHOOL
24. IRVINE AUDITORIUM
25. HOUSTON HALL
26. HARE BUILDING — REPLACED BY NEW HUMANITIES BUILDING
27. LOGAN HALL
28. FRANKLIN SOCIETY — REPLACED BY NEW UNIVERSITY LIBRARY
29. BLANCHARD HALL—REPLACED BY GRADUATE LIBRARY
30. UNIVERSITY LIBRARY
31. BENNETT HALL
32. FINANCIAL OFFICES — REPLACED BY MOORE SCHOOL EXPANSION
33. MOORE SCHOOL
34. TOWNE BUILDING
35. DEVELOPMENT OFFICES—REPLACED BY HUMANITIES—PHYSICAL SCIENCES
36. SCHOOL OF NURSING—REPLACED BY HUMANITIES—PHYSICAL SCIENCES
37. GENERAL LABORATORIES—REPLACED BY NEW SCIENCES BUILDING
38. CHEMISTRY LABORATORY
39. PHYSICAL SCIENCES BUILDING
40. SCHOOL OF FINE ARTS — REPLACED BY PHYSICAL SCIENCES & ENGINEERING
41. DECATUR HALL — REPLACED BY PHYSICAL SCIENCES FACILITY
42. TANDEM ACCELERATOR
43. PALESTRA
44. SQUASH COURTS
45. HUTCHINSON GYMNASIUM
46. WEIGHTMAN HALL
47. FRANKLIN FIELD
48. UNIVERSITY MUSEUM
49. WOMEN'S RESIDENCE HALLS
50. UNIVERSITY HOSPITAL
51. RAVDIN INSTITUTE
52. TENNIS COURTS
53. BIOLOGICAL RESEARCH
54. ZOOLOGICAL LABORATORIES
55. GREENHOUSES
56. UNIVERSITY MAINTENANCE & REPAIR — REPLACED BY GRADUATE LIBRARY
57. WHITE TRAINING HOUSE
58. ANNENBERG SCHOOL OF COMMUNICATIONS
59. VICTORIA APARTMENTS—REPLACED BY SOCIAL SCIENCES
60. ILLMAN CARTER — REPLACED BY MEN'S DORMITORIES
61. BIOLOGICAL ABSTRACTS
62. MEN'S DORMITORIES
63. GRADUATE HOUSING
64. VETERINARY SCHOOL EXPANSION
65. SOCIAL SCIENCES CENTER
66. MEN'S DORMITORY ADDITION
67. PHYSICAL SCIENCES ADDITION
68. DIETRICH HALL ADDITION
69. MEDICAL SCHOOL FACILITIES
70. MEDICAL SCIENCE FACILITY
71. LAW SCHOOL ADDITION
72. GRADUATE LIBRARY
73. ADMINISTRATION—EXISTING AND NEW CONSTRUCTION
74. GRADUATE CENTER
75. HUMANITIES—PHYSICAL SCIENCES BUILDING
76. LABORATORY FOR RESEARCH ON THE STRUCTURE OF MATTER
77. DENTAL SCHOOL EXPANSION
78. MEN'S DORMITORIES
79. GRADUATE HOUSING
80. ALUMNI CENTER
81. SOCIAL SCIENCES EXPANSION
82. HUMANITIES EXPANSION
83. FACULTY CLUB EXPANSION
84. WISTAR INSTITUTE EXPANSION
85. BIOLOGICAL-MEDICAL EXPANSION
86. NEW HARE BUILDING
87. GRADUATE SCHOOL OF ARTS & SCIENCES—GRADUATE CENTER
88. WOMEN'S RESIDENCE HALLS
89. MOORE SCHOOL EXPANSION
90. CHEMISTRY EXPANSION
91. PHYSICAL SCIENCES & ENGINEERING
92. PHYSICAL SCIENCES RESEARCH—PARTICLE PHYSICS LABORATORY
93. PHYSICAL SCIENCES FACILITY
94. ATHLETIC FACILITIES
95. ATHLETIC FIELDS
96. MUSEUM EXPANSION
97. UNIVERSITY HOSPITAL REDEVELOPMENT
98. ACADEMIC FACILITIES — GRADUATE, PROFESSIONAL, RESEARCH
99. EXISTING ST. MARY'S CHURCH BUILDINGS

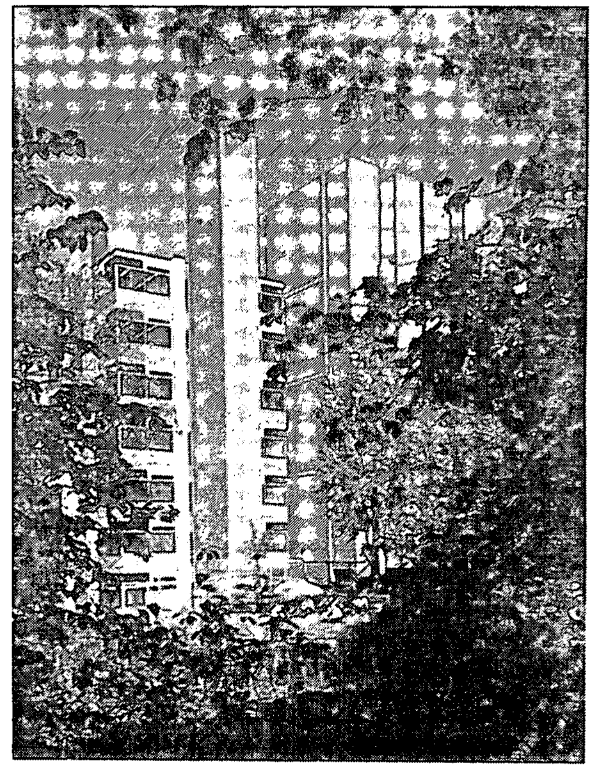


3A

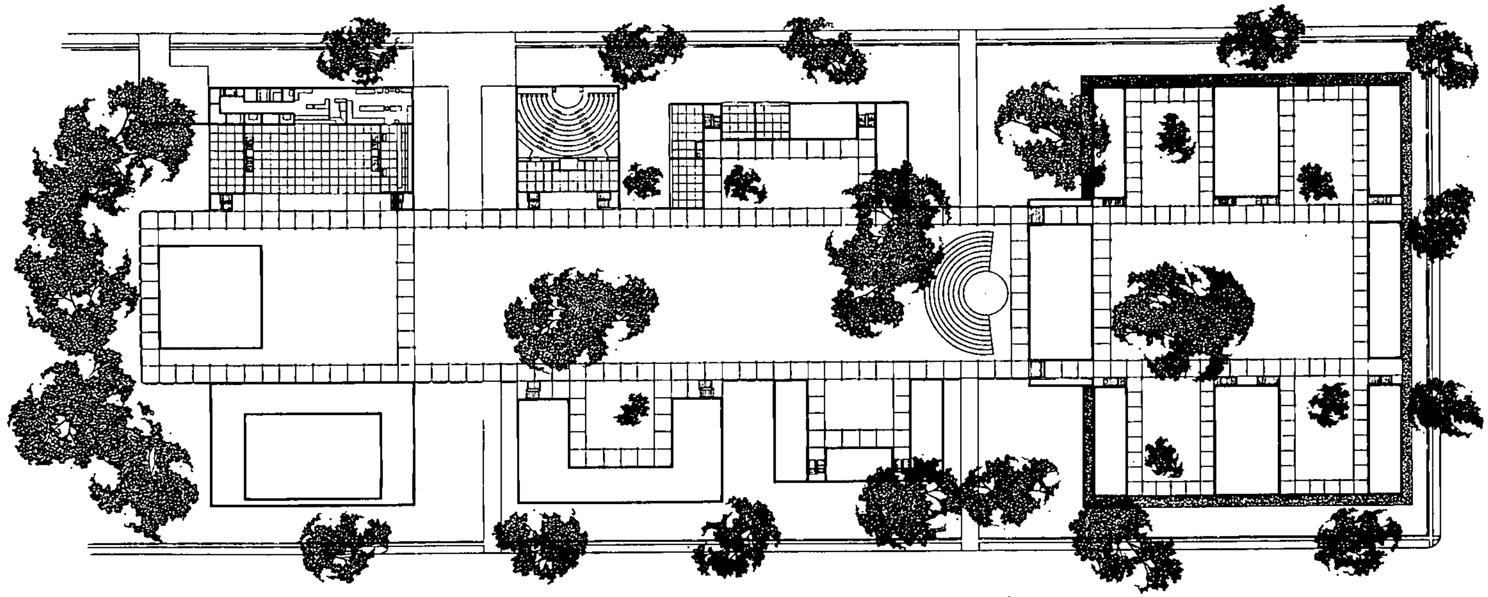
The three dimensional form of the long-range development plan at the University of Pennsylvania is shown to the left and in the model above. By combining many smaller blocks into several super-blocks, the academic environment will be protected from the intrusions and distractions of urban activity.

Buildings 23 to 25, important campus landmarks, will be used as orientation points for those traveling along the path systems in the central campus; as will the towers of the famed Richards building by Louis Kahn in the southern quadrant. See photo.

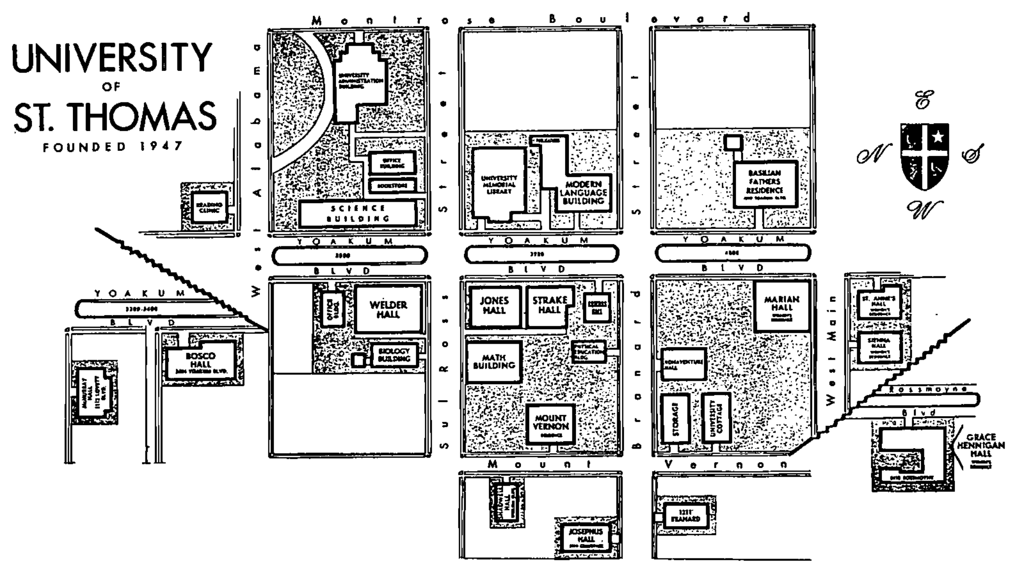
PHOTOS: LAWRENCE S. WILLIAMS, INC.
COURTESY OF UNIVERSITY OF PENNSYLVANIA
PLANNING OFFICE



3B



4A


UNIVERSITY
OF
ST. THOMAS
FOUNDED 1947
Montrose Boulevard
West Alabama
Sul Ross
Branard Street
Mount Vernon
West Main
Rossmoyne Blvd
YOAKUM BLVD
SCIENCE BUILDING
WELDER HALL
BIOLOGY BUILDING
BOSCO HALL
MODERN LANGUAGE BUILDING
JONES HALL
STRAKE HALL
MATH BUILDING
MOUNT VERNON
BASILIAN FATHERS RESIDENCE
MARIAN HALL
STORAGE
UNIVERSITY COTTAGE
GRACE HENNIGAN HALL

4B

251

4A, B, C, D
University of St. Thomas (1956)
Houston, Texas
Co-educational
Sectarian
Spring 1962 enrollment: 557
Plan prepared in 1956

PHOTOS AND PLANS COURTESY OF THE ARCHITECT: PHILIP JOHNSON ASSOCIATES

Original campus was spread over twelve city blocks, in permanent and non-permanent facilities. The master plan designed by the architect attempted to bring order to the campus by creating a super-block. (See master plan and map of existing physical plant.) In this highly formal plan all buildings front on a campus green. Johnson consciously used Jefferson's University of Virginia plan as a model, and intended to close the end of the "U" with a residential complex (6). (Note: all numbers refer to plan and block model)

The northern end of the long mall will be dominated by a chapel (2). Buildings constructed include: (1) Student Union, Welder Hall; (4) Assembly and Fine Arts building, Strake and Jones Halls. Other buildings planned include: (3) Priest Residence, (7) and (8) Classroom or Science buildings.

Recognizing that future buildings may not conform to the spaces established in the master plan, the architect has designed the plan on modular basis so that the green spine can be preserved as an element unifying both sides of the mall.

PHOTO OF CLASSROOM BLDG.: FRANK L. MILLER
ALL OTHER PHOTOS AND PLANS COURTESY OF THE ARCHITECT: PHILIP JOHNSON ASSOCIATES

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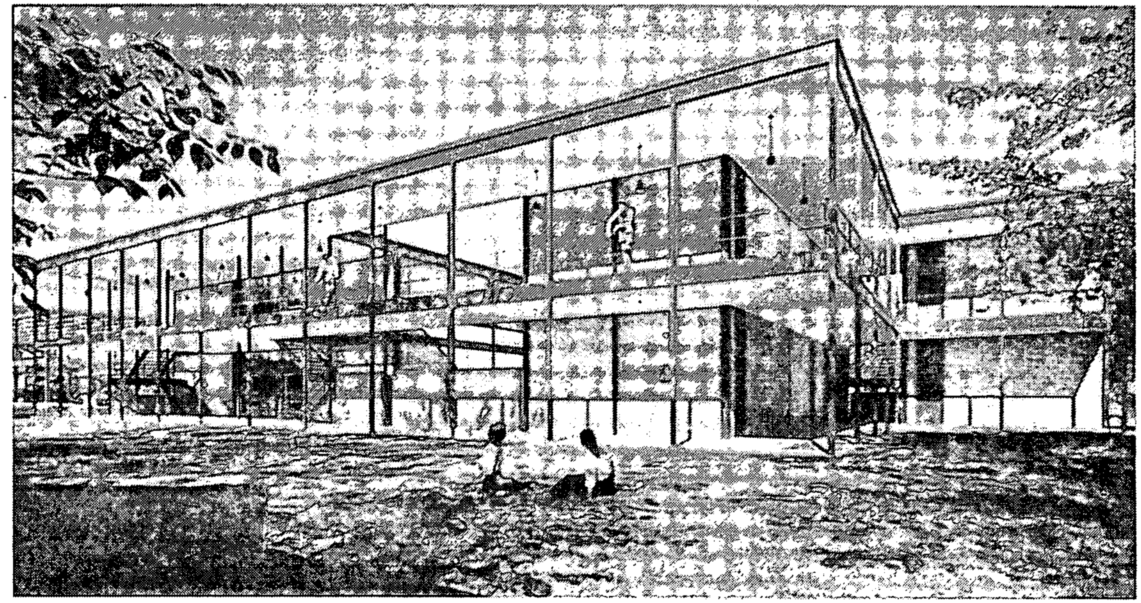
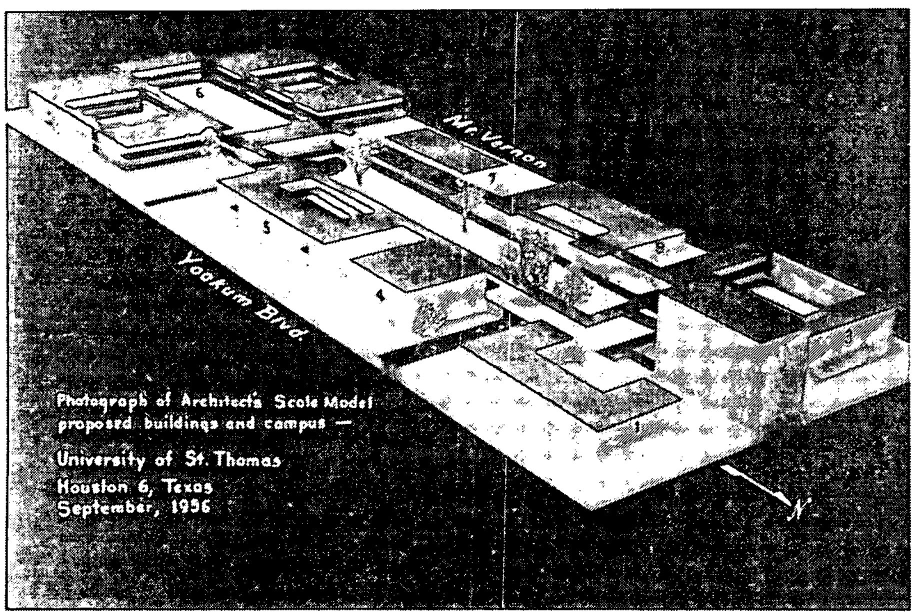
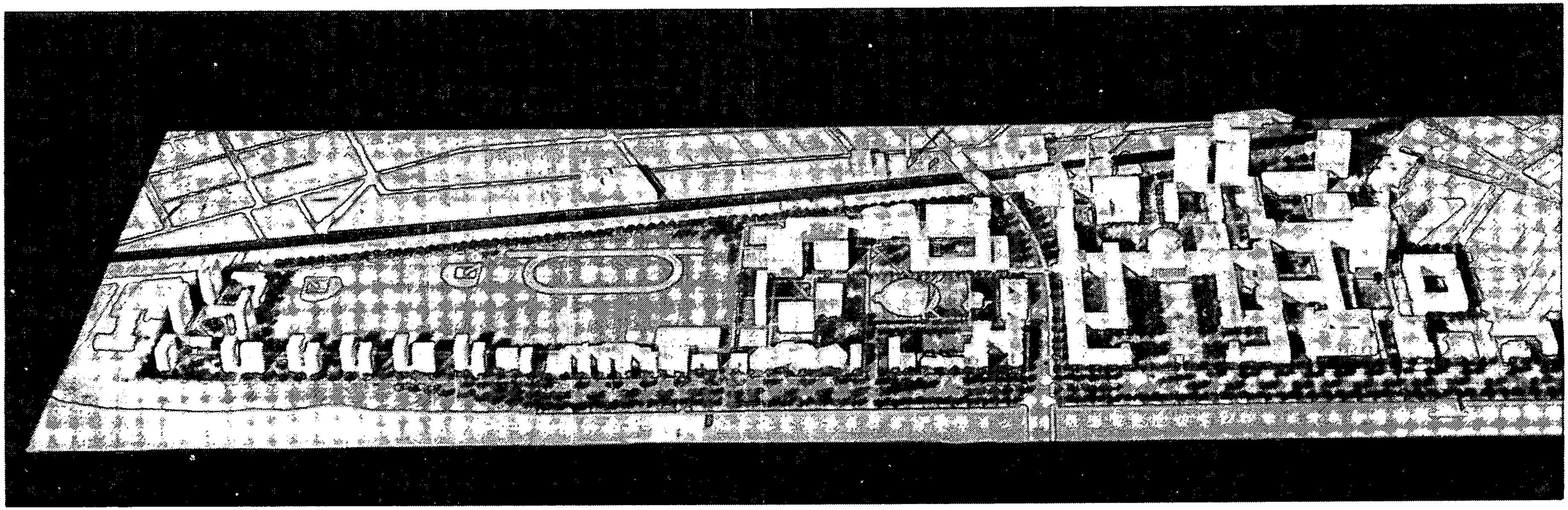


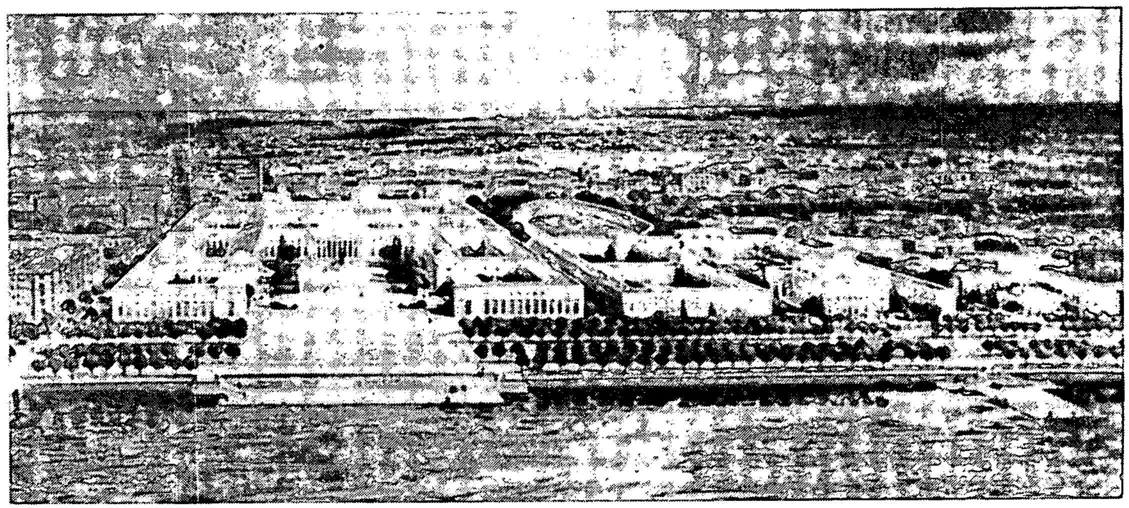
4D



4C



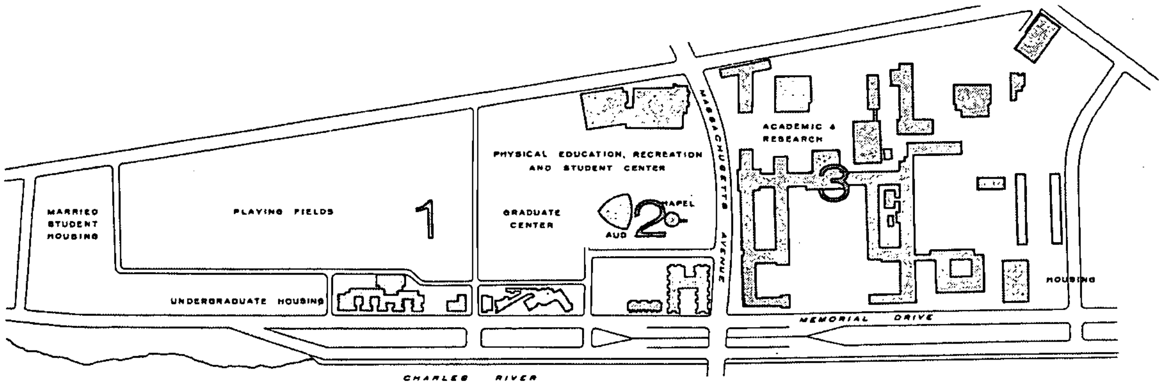
5A



5B

5A
Long-range Development Plan (1960)
Massachusetts Institute of Technology
Cambridge, Massachusetts
Prepared by Sasaki, Walker & Associates, Inc.
in collaboration with the MIT Planning Office.
PHOTO: EZRA STOLLER

5B
Rendering of the 1916 plan of Welles Bosworth
prepared for the Institute to guide its development at the time it moved from Boston to Cambridge.
PHOTO: MIT PLANNING OFFICE



5C

Diagram of existing campus showing general location of long-range use areas.

The elements of the plan, as shown on the model, are arranged to accommodate increases of fifty per cent in campus population and thirty-three per cent in floor space.

Five major program and design principles have guided the formation of the plan.

Principle 1. East Campus (3) would be devoted to instructional, research, administration, and related activities. West Campus (1) would be used for housing and recreation. Linking the two together would be a central activity area (2), containing auditorium, chapel, student center, and physical education facilities.

Principle 2. In the East Campus academic and research buildings are to be interconnected, allowing for easy communication and movement, as well as providing maximum flexibility for shifts in the assignment of space. This continues the early design concept of Welles Bosworth, architect of the first buildings.

Principle 3. West campus is to contain a full range of housing types and represent all aspects of a viable academic community: undergraduate housing, graduate housing, married student housing, and housing for some members of the faculty and administration.

Principle 4. The nature of the dense urban setting of the environs, which limit horizontal expansion, is recognized in the suggested use of high rise facilities. West campus housing, for example, takes advantage of the open space (visual) of the Charles River, and open space (physical) of the playing fields. East campus expansion is made possible by selectively developing density buildings through the programming of floor space on the basis of use zones. (See Earth Sciences building, lower left.)

Principle 5. The central campus facilities would be as compact as possible, and the ground spaces such as those around the auditorium-student center-chapel complex will be intensively embellished. The peripheries of the campus will be used for parking (in structures) and those research activities which require proximity to central campus, but are used by a limited number of personnel.

5D

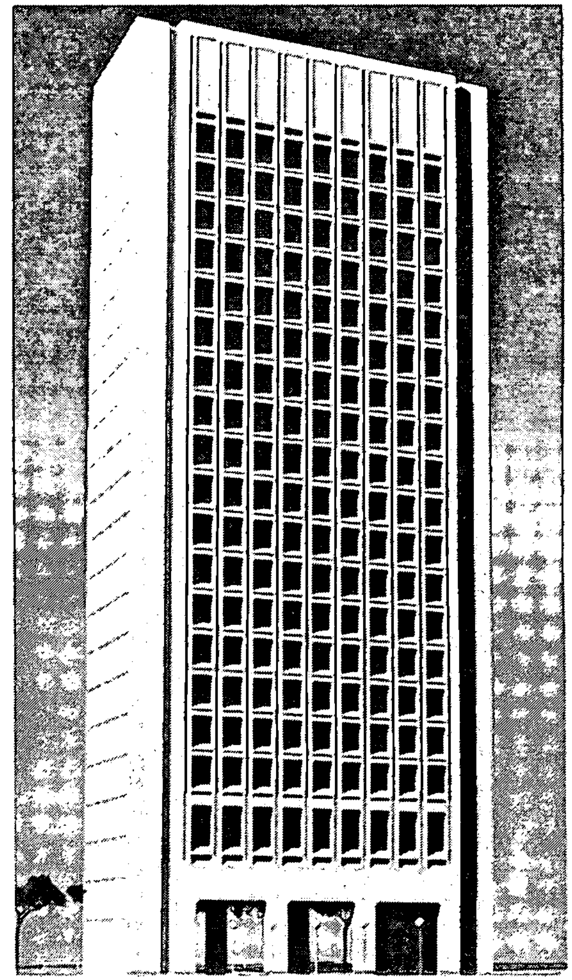
Earth Sciences Building (1961)

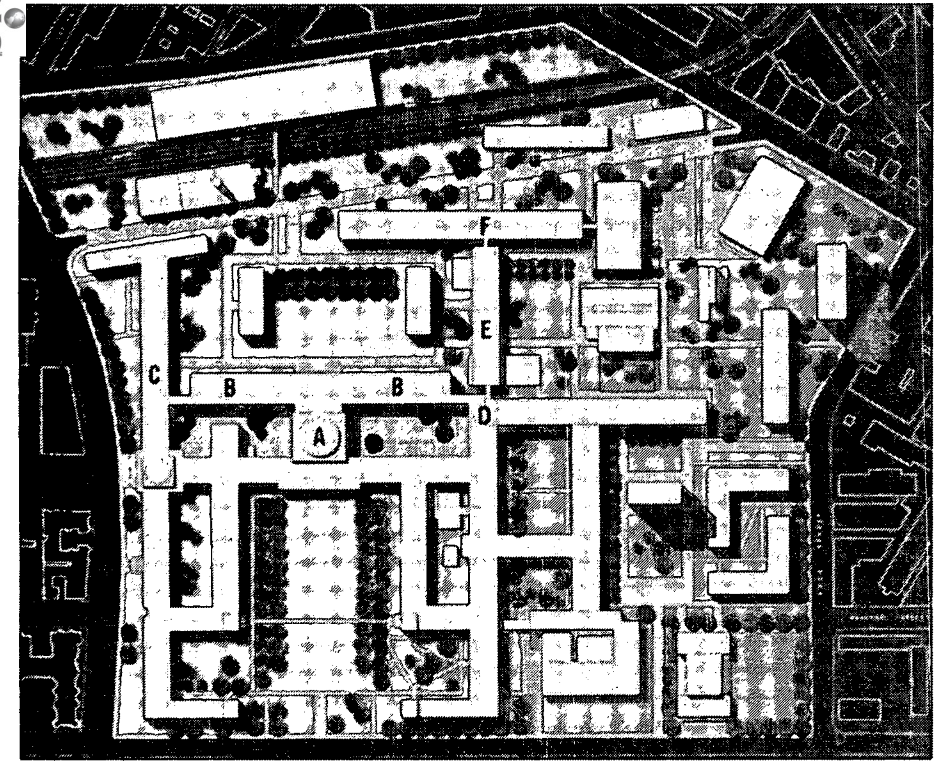
I. M. Pei & Associates, Architects

The building advances the "center of learning" concept. Primary purpose is to train undergraduate and graduate students in the several earth sciences: meteorology, oceanography, geology, geophysics and geochemistry. The twenty story structure will contain about 126,000 square feet of air-conditioned space, with provision for 185 instructional, research and staff members, and instructional facilities for 1,000 students. (Not FTE, but total enrolled in scheduled classes.) Cost: $5 million.

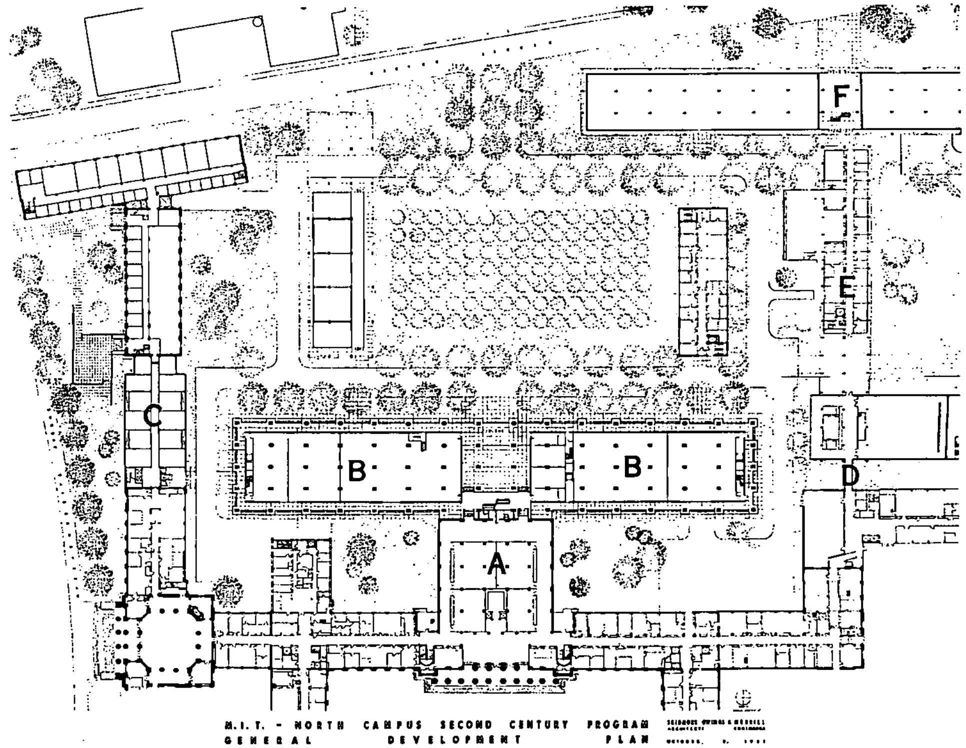
The problem of vertical circulation is resolved by limiting intense uses (numbers of people) to the first four floors (auditorium, libraries and classrooms). The fifth to the 20th floors are designed for general laboratory and faculty offices. Elevator service is provided only to the sixteen upper floors during peak service hours.

PHOTO: MIT PLANNING OFFICE

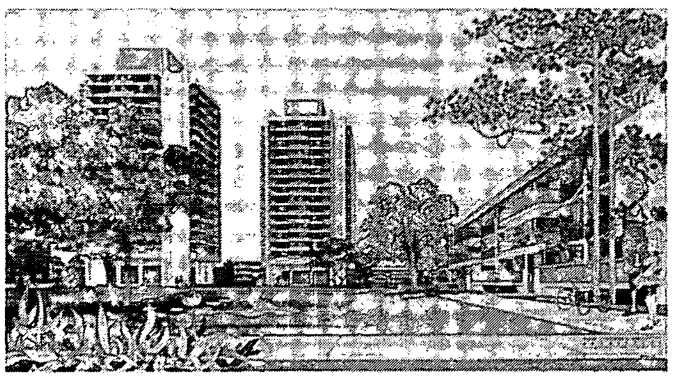




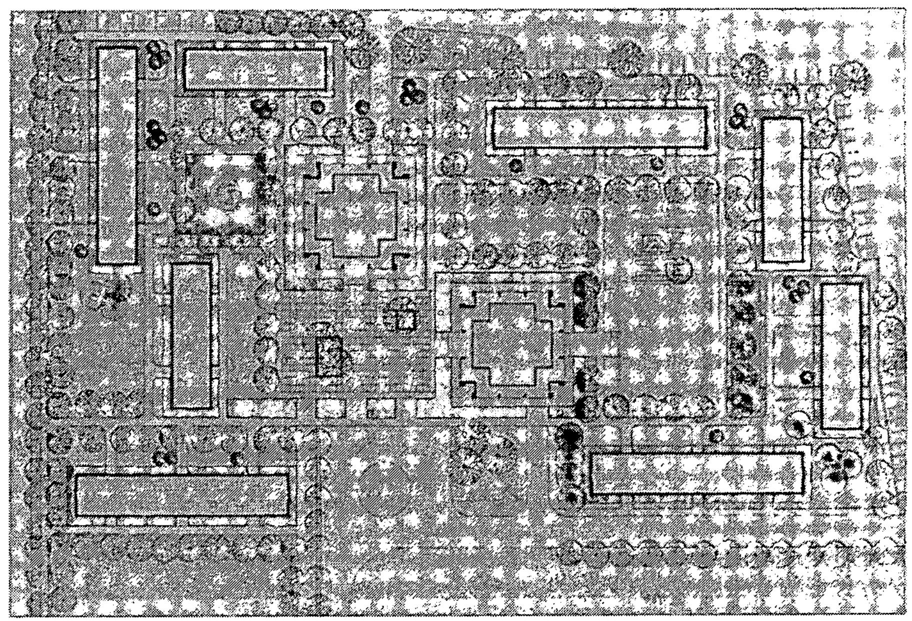
5E



5E



5F



5F

5F

Married Student Housing 1963

Hugh Stubbins & Associates, Architects
Sasaki, Walker & Associates, Inc., Site Consultants

The two tower buildings will each contain 90 one-room efficiency apartments and 60 one-bedroom units. The three story structures are designed as two-bedroom family units, with fifteen apartments per structure. Parking is provided for seventy per cent of the total units. The general location was established in the 1960 development plan, shown on the preceding page, at the far end of the East Campus.

DRAWINGS: HUGH STUBBINS AND ASSOCIATES

North Campus Extensions

The illustration on the preceding page indicated the existing permanent buildings on East Campus. Shown *above* is the 1961 refinement of a portion of the long-range plan, prepared by Skidmore, Owings & Merrill. *Below* the ground floor plans showing the connections between the older buildings and the new additions, as designated in a later revision. (A) is the main dome, in both schemes. Additions (B) are planned to accommodate the proposed Materials Sciences and Engineering departments. Additions (C) and (E) would join together existing academic buildings, while (F) is the proposed location for long-range expansion of electronics and engineering.

PHOTOS: MIT PLANNING OFFICE

6

Wheaton College (1960)

Norton, Massachusetts

Women

Private

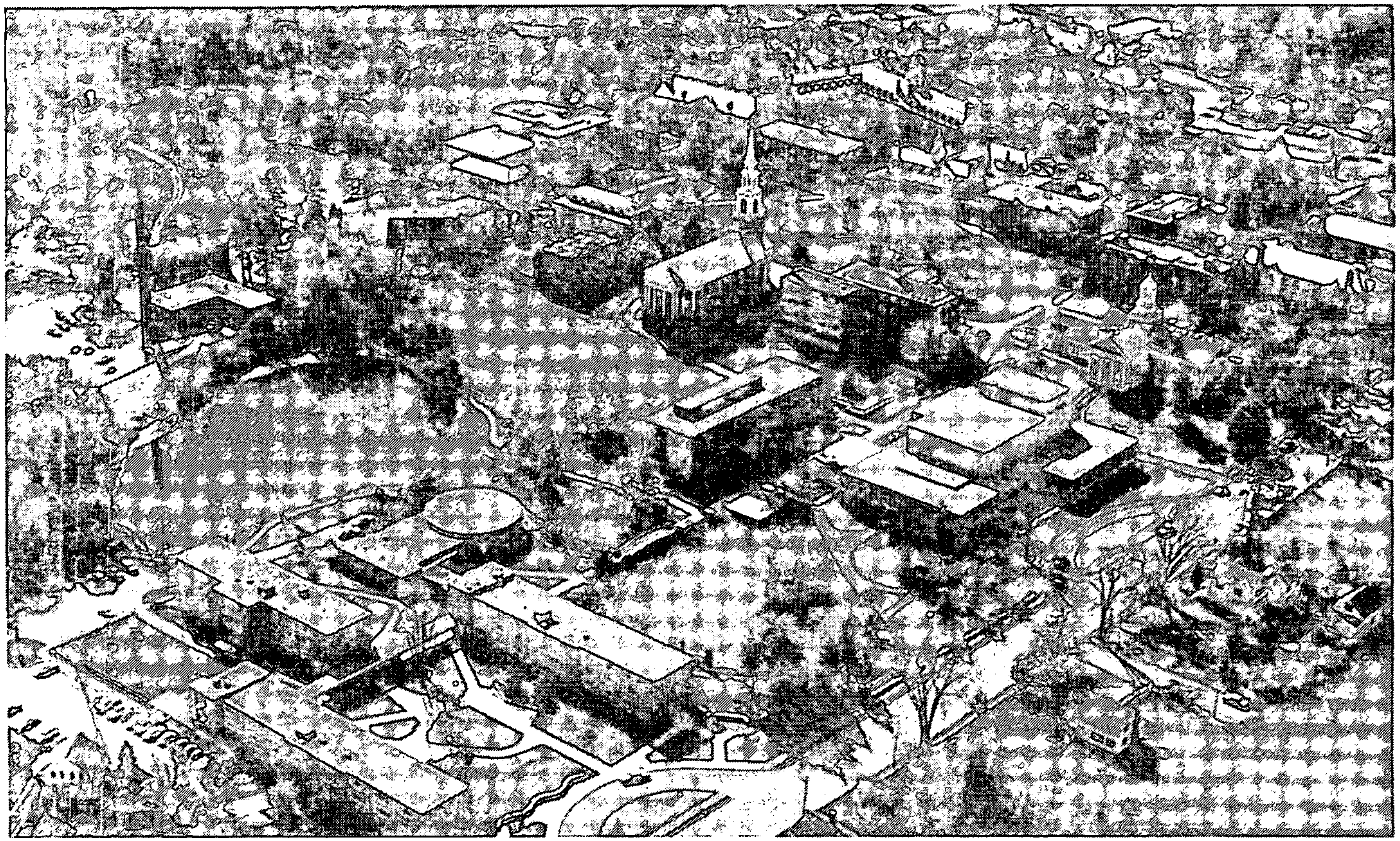
Spring 1962 enrollment: 797

Master plan by: Shurcliff and Merrill (1962), Landscape Architects

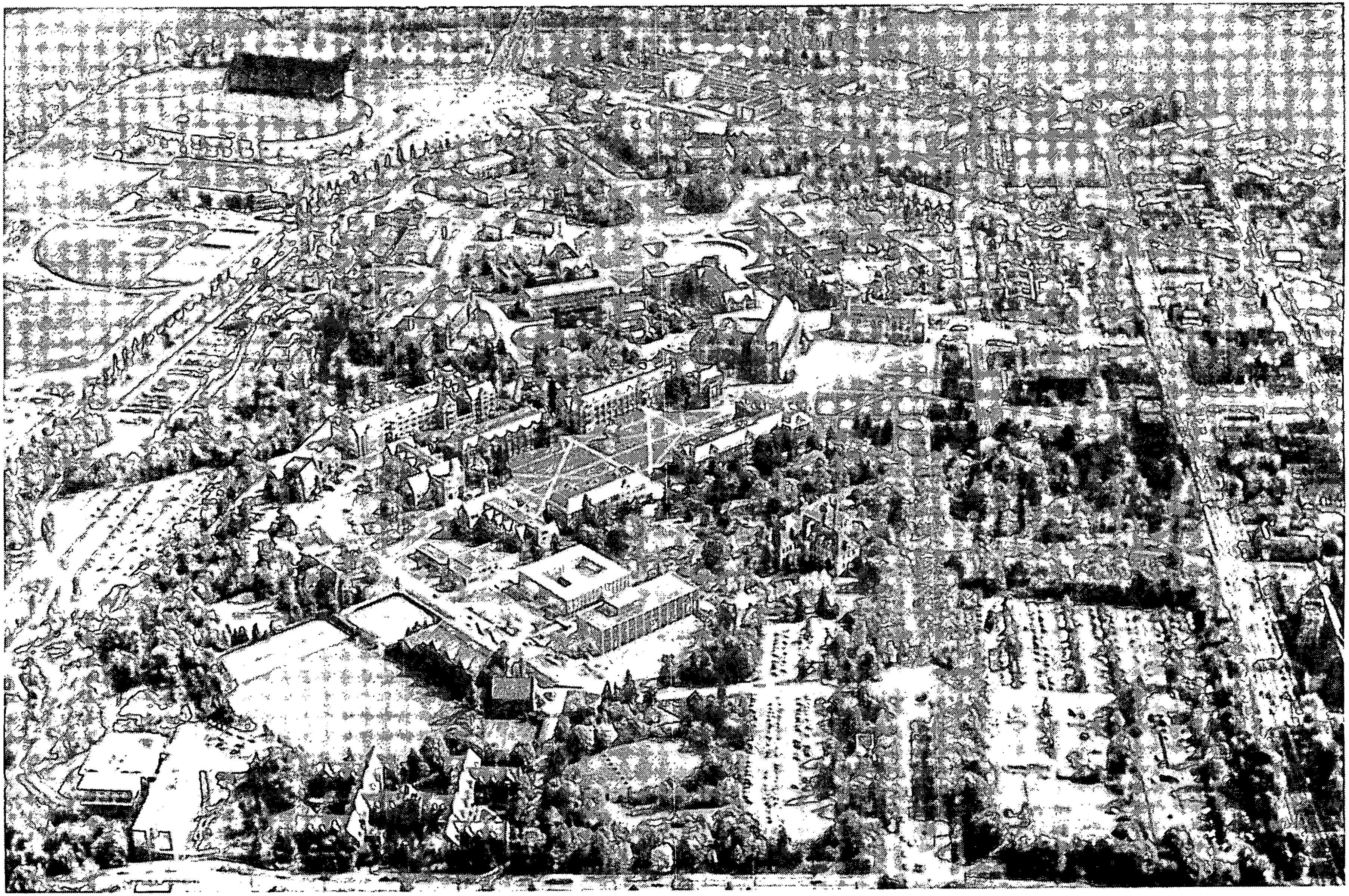
Architects: Rich and Tucker

The quadrangle at the top of the picture was designed by Cram and Ferguson (1904-1939). Rather than attempt to fill in the older area when the school began to construct contemporary buildings, it was decided to start a second academic quadrangle. This is located between a new residential area (lower left) and the older mall. An artificially induced lake serves as a visual link between the two new sectors. The residential dining hall overlooks the lake. A major pedestrian way connects dormitories, new academic buildings and the older part of the campus. The sequence can be traced in the air view below: covered walkway in the dormitory area, bridge over the lake, the plaza in front of the Humanities and Fine Arts building, and then into the classical mall.

AIR PHOTO: ARBER-FRENCH



6



7A

7
University of Washington (1961)
Seattle, Washington
Co-educational
Public supported
Spring 1962 enrollment: 22,489
Plans prepared by the Office of the University Architect
Drawings and photos courtesy of the University of Washington

7B View to the south

Development of the present University of Washington campus has ben guided over the years by a series of comprehensive plans. The earliest of these, formulated in the 1890's, were thought to be definitive and complete for all future time, but changing social conditions and evolutions in academic emphasis have repeatedly changed the needs of the University in ways impossible to predict far in advance. Periodically, therefore, it has been necessary to formulate a new plan, borrowing theory from the old and building upon past progress, but taking into account newly emerging requirements. It is, however, high testimony to the perception and foresight of the planners of past generations that the University campus now conforms very closely to principles currently recognized as essential to attractiveness and efficiency.

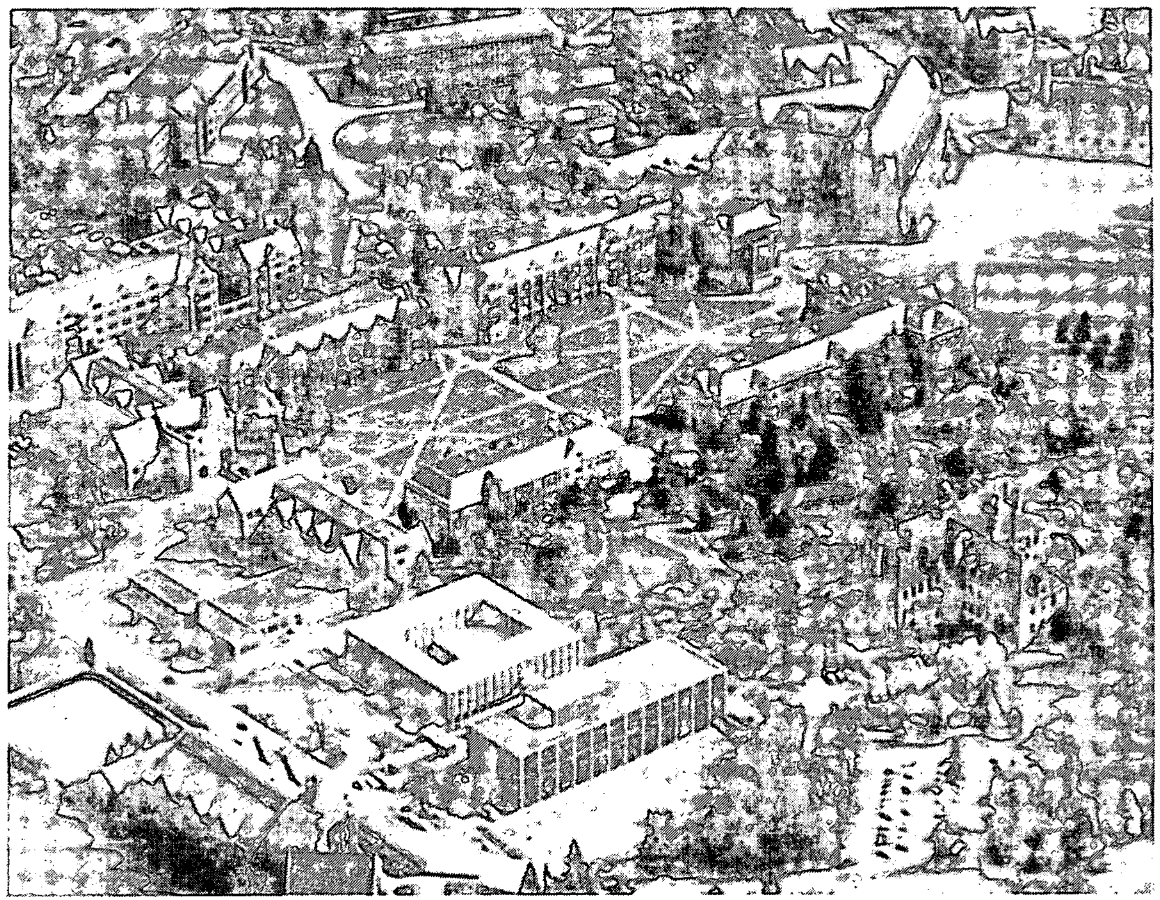
The present physical form of the University campus contains a historical record of past planning. Parrington, Denny, Lewis and Clark Halls are remnants of the 1900 Fuller Oval Plan. Rainier Vista was the central axis of the Olmsted Brothers plan for the Alaska-Yukon-Pacific Exposition of 1909. Architects Bebb and Gould, in the 1915 plan, formulated the basic land use pattern and building grouping, centered on the library as the campus focus, still followed with revisions, to the present time.

Historically, the campus plan has normally been revised in response to predictions of rapid change, either in terms of enrollment growth or curriculum modification or both. Such revisions to the plan were made in 1921, 1927, 1934, and 1949 by Bebb and Gould and their successors.

It was first suggested in the late 1930's that land should be acquired west of the campus to improve the west approaches to the University and to meet the newly recognized need for an expanded student housing program. Several years later Campus Parkway was constructed and studies begun of possible ways to expand westward. Culminating this period of study, the 1949 revision of the campus plan was the first to advise use of the area to the west for housing. By then it had become abundantly evident that the Union Bay marshlands could not be used for heavy construction and that the central and south campus would be indispensable, and none too adequate for academic purposes, much less housing.

In 1961, facing a period of unparalleled enrollment growth and academic evolution, the University employed Mr. Paul Thiry, Architect, to again analyze University needs and suggest how they might best be met. The 1961 plan was the first to indicate that the western area might be developed for housing and academic purposes under the provisions of Section 112 of the Federal Housing Act (Urban Renewal as applied to Colleges and Universities).

FROM: UNIVERSITY OF WASHINGTON GENERAL DEVELOPMENT PLAN, MAY 1, 1962
INTRODUCTION



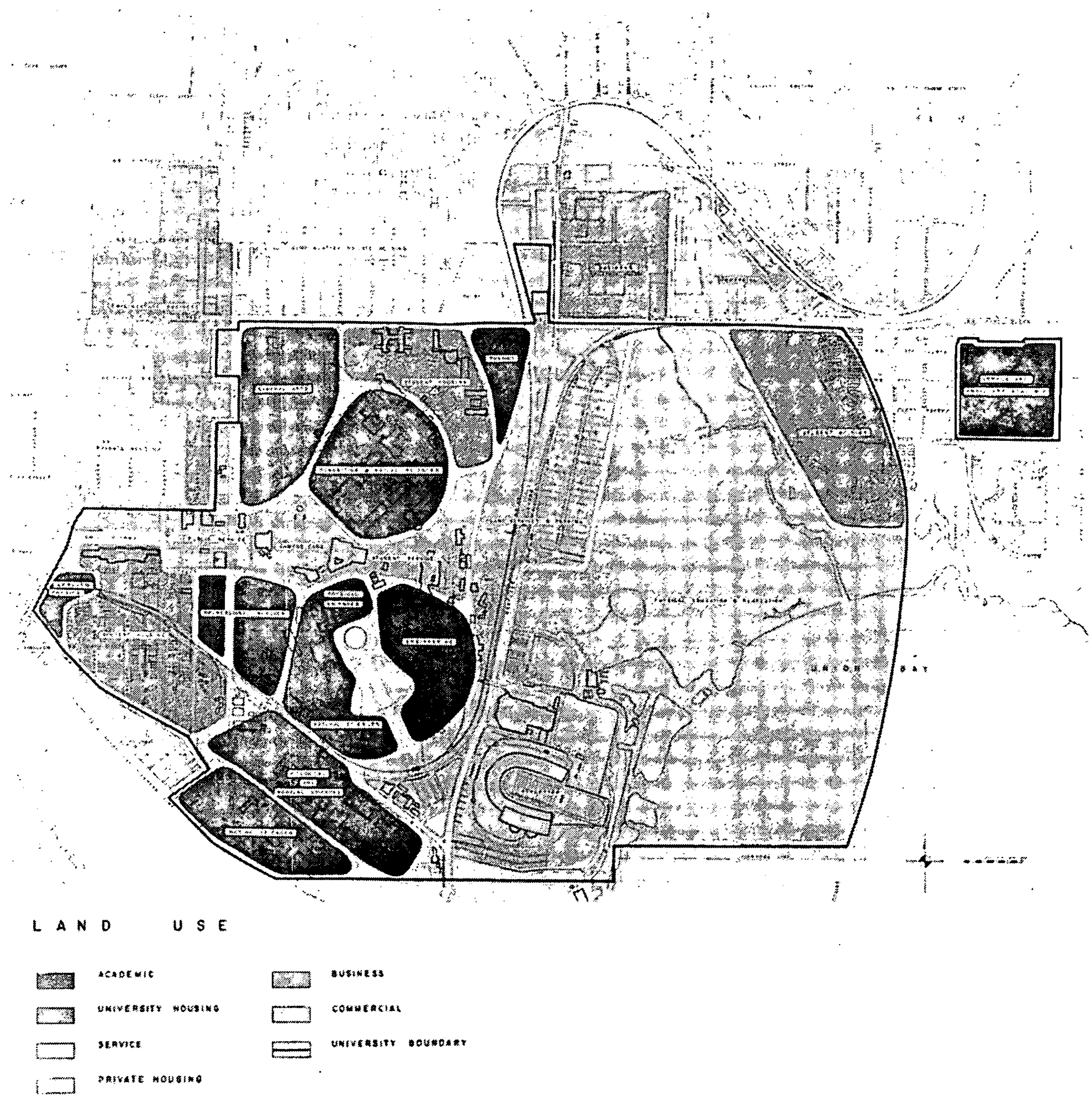
7B

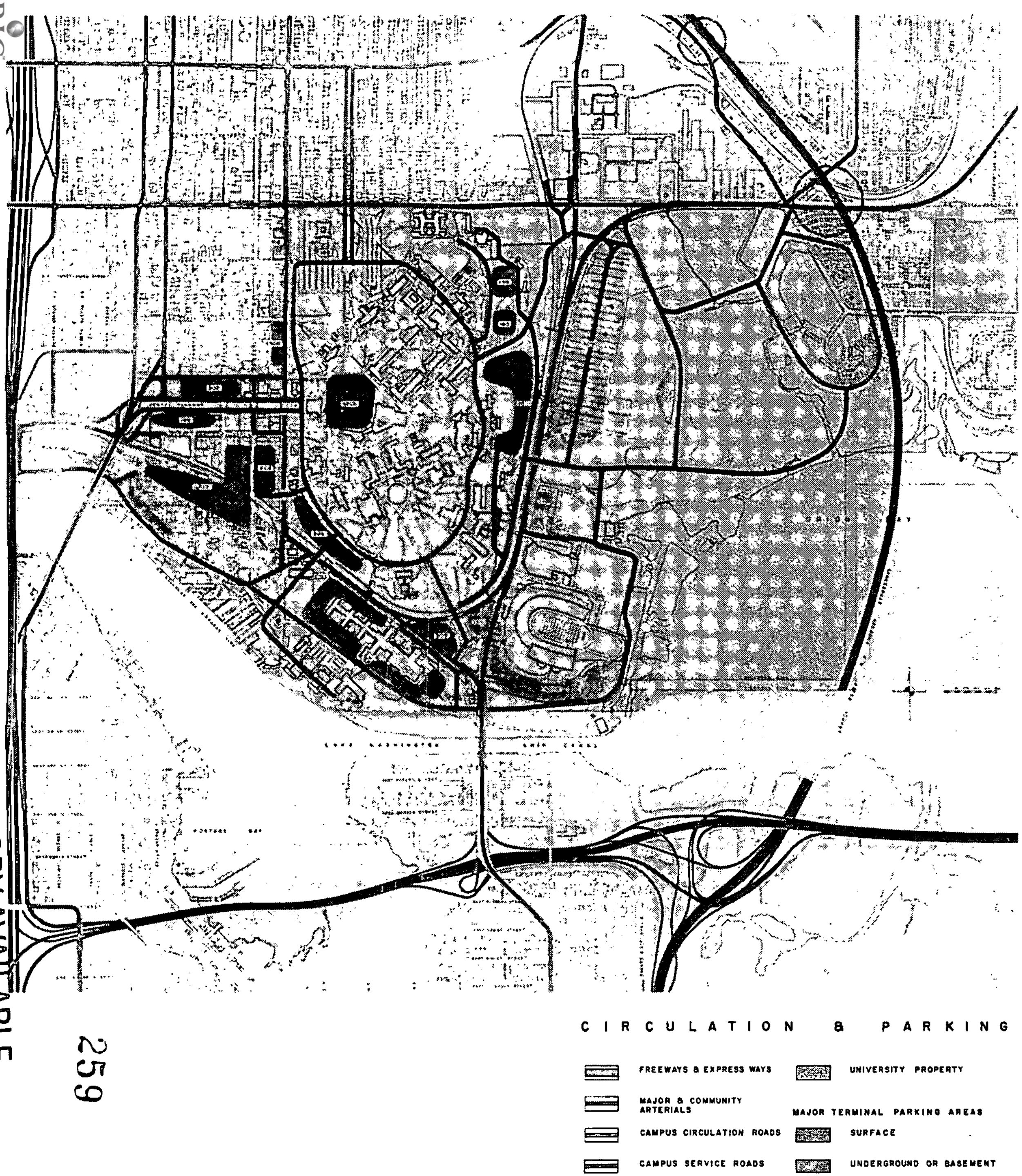
7B

The University campus is divided into ten major land-use areas.

1. Campus Core. Stretching from west to east this land use will contain central facilities such as library, administration, union buildings, in addition to buildings used by the public such as the Art Gallery, Playhouse Theatre, and Housing Office.
2. Liberal Arts
3. Sciences
4. Basic and Applied Health Sciences
5. Marine Sciences
6. Athletics—Physical Education
7. Student Housing
8. Professional Schools
9. Plant Services

Union Bay Reclamation (10) is currently a massive peat bog and marshland being reclaimed jointly by the University and the City. Expressway route (see above right) will be used as the natural barrier and act as a dike while land is filled. In the beginning the filled land will be suitable only for recreation and parking, but when the required depths are completed, building construction can begin. This then is the University's long-range land bank for expansion in the 21st century.





7C
Circulation and Parking

Proposed pedestrian and circulation patterns have been planned to serve essential needs of the University and Community. The circulation plan consists of three basic rings:

1. Freeways and Expressways
2. Major and Community Arteries
3. Campus Road System.

Freeways and expressways (the outer lines shown west, south and east) will provide ready access to distant points. As a limited access ring, non-University traffic will by-pass the campus area without congesting city streets.

Because of its site location the second arterial ring serving community and campus could not be excluded from the campus property. However, public thoroughfares cutting through the campus are located where natural terrain permits easy bridging for pedestrian and campus service traffic. In addition the through streets are located at the edge of land uses, rather than cutting through any single land-use function.

Inner campus roads have been adjusted to allow a major automobile-free pedestrian precinct, and at the same time allow service roads off the inner loop. Parking needs will be satisfied by 15,000 spaces, most of these in large lots peripheral to the academic core.

8
Green Mountain College (1961)
Poultney, Vermont
Women
Sectarian
Spring 1962 enrollment: 113
Plans and drawings courtesy of the architect:
Milton Lee Crandall, AIA
George Bebb, Consulting Landscape Architect

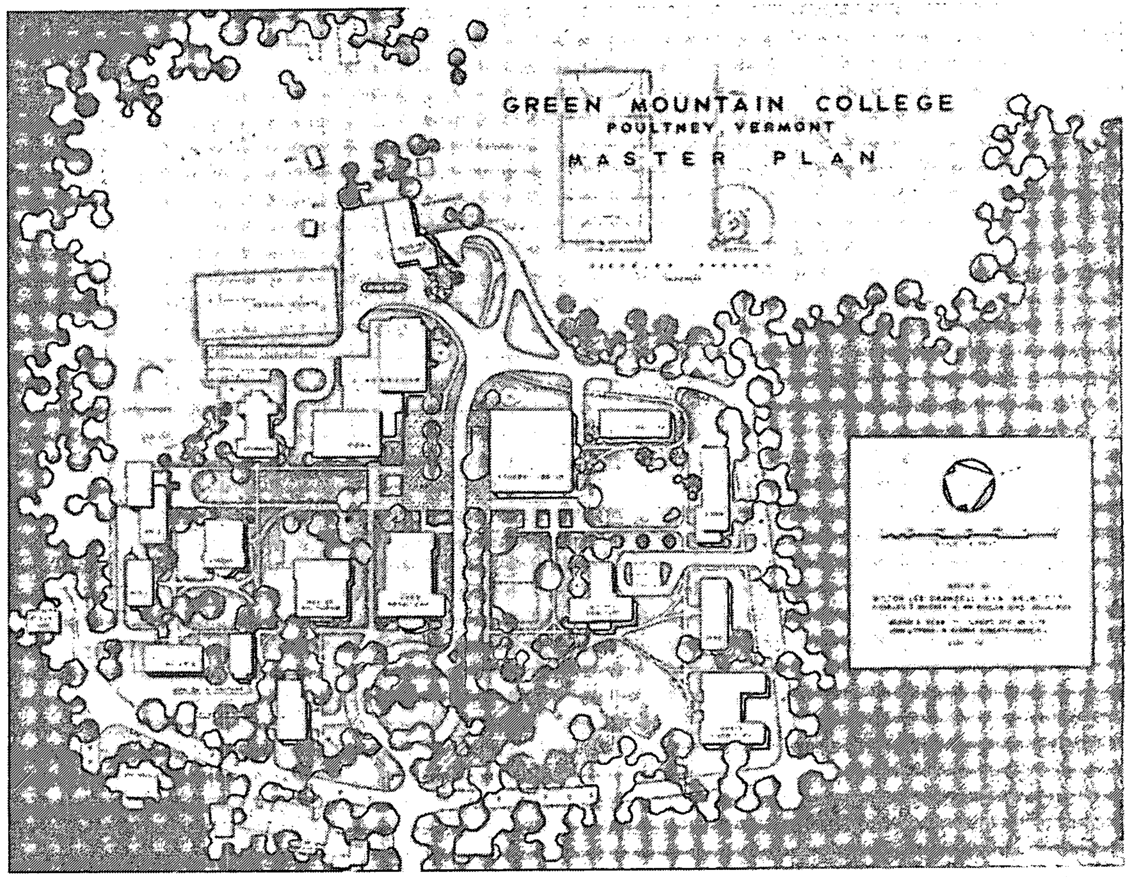
8A

This plan was prepared to allow the college to grow to 600 students. Existing buildings had to be utilized and the school established the policy that no additional land would be acquired.

The campus was divided into three general growth areas: academic and administrative activities on the south campus; residential units on the north campus; and physical education, health, and social facilities on the west campus.

8B

The traditional front face of the college is maintained as the Georgian style is to be continued in the dormitory area and administration area. The new gymnasium and the Arts and Science buildings, however, will be in contemporary idioms, and will be grouped around the dominant interior central mall. Older styles face on their own quadrangles. All buildings are oriented inwards from the surrounding environs. The vistas created are intended to give a feeling of greater depth to the campus than it presently has.
PHOTO: RICHARD K. DEAN



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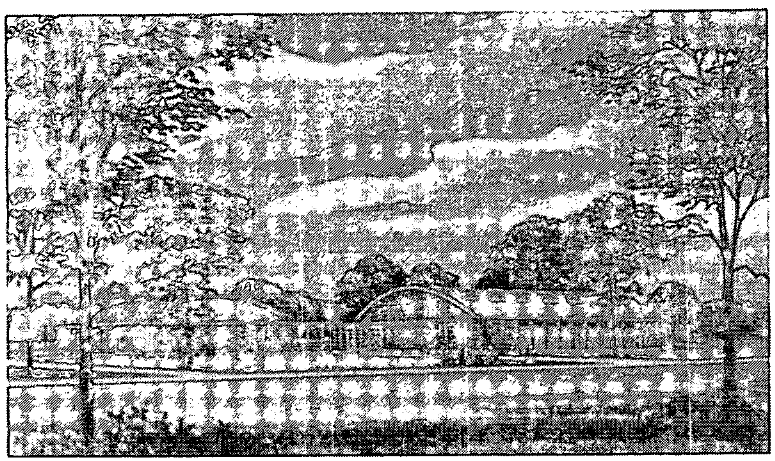

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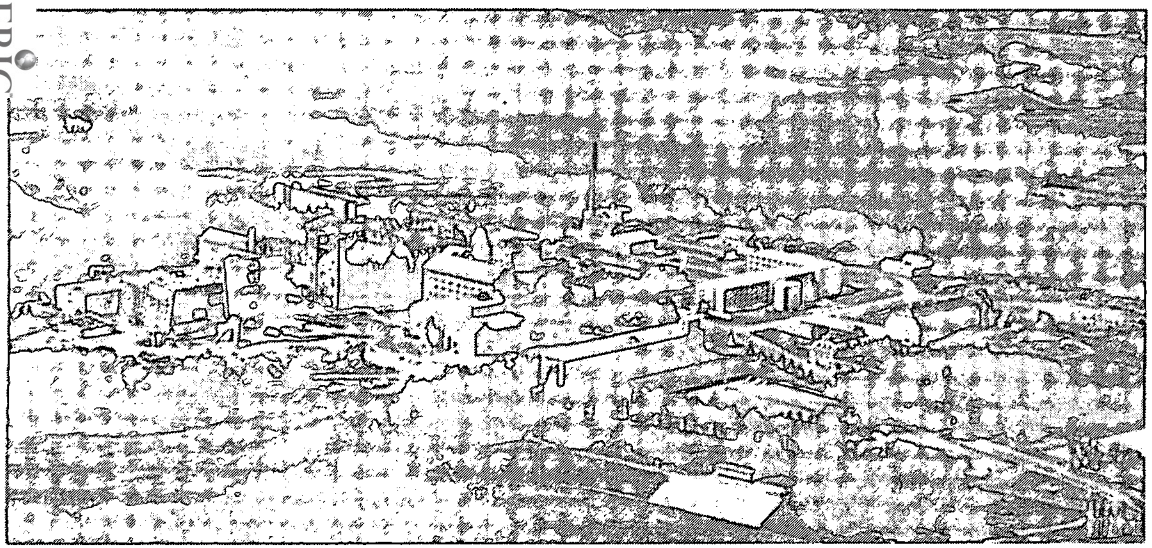
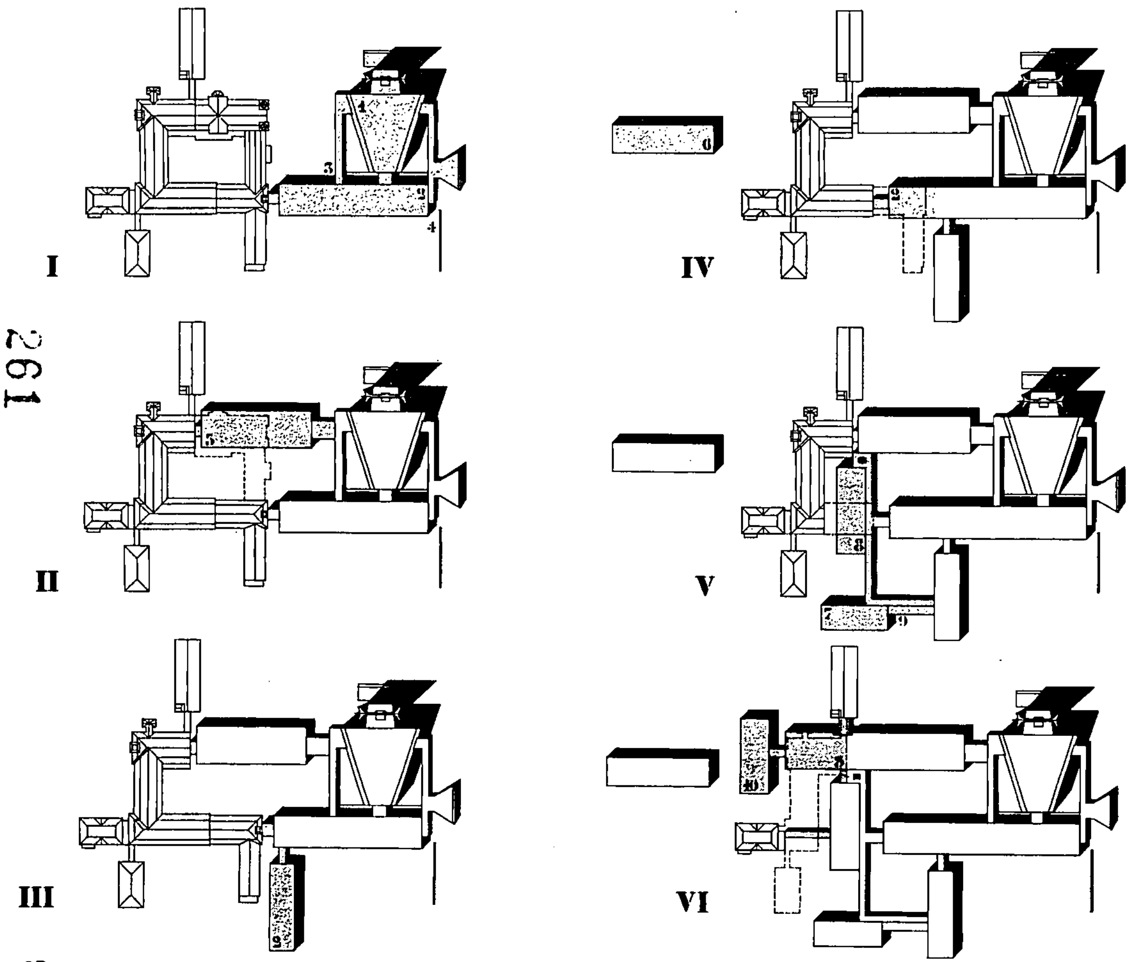


9A



9B

9

St. John's University
Collegeville, Minnesota
Male
Sectarian
Enrollment Spring 1962: 1,207
Master Plan and Project Plans (1953-62)
Architect: Marcel Breuer, FAIA
Associate: Hamilton Smith, AIA

In addition to the commendable project architecture, this commission is interesting because of its special program requirements, and the techniques by which the architect has planned a gradual replacement of older facilities with a sequence of buildings in the contemporary idiom.

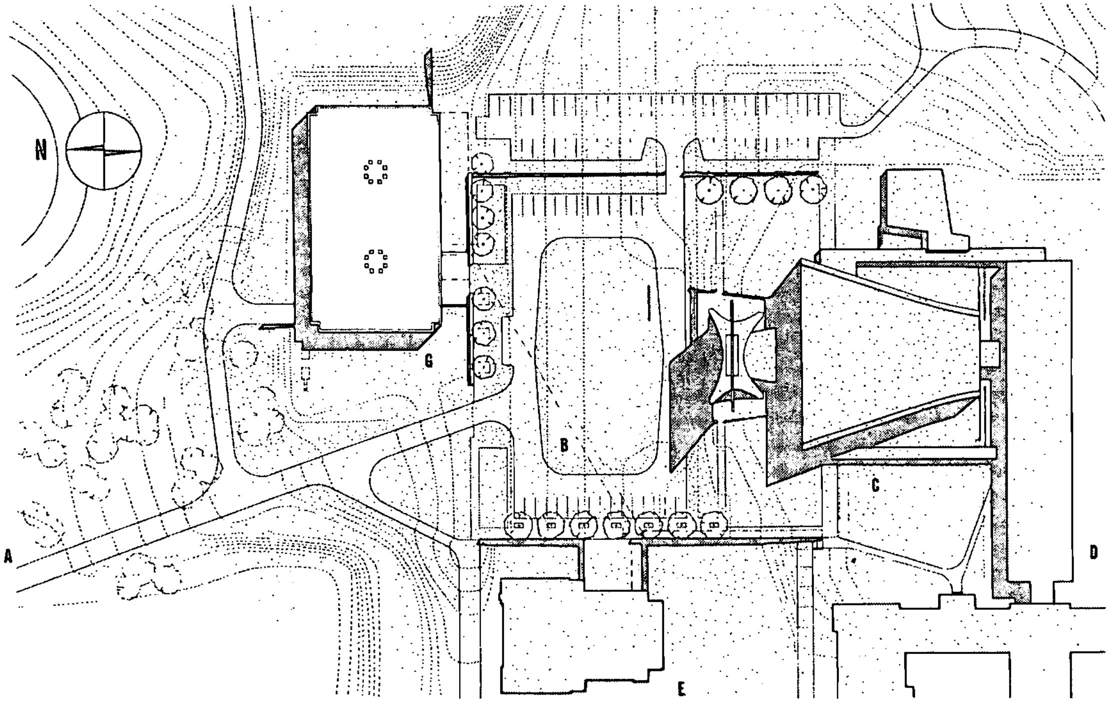
9A

Up to the time of Marcel Breuer's study, St. John's University (see air view) had grown haphazardly outwards from a 75 year old central quadrangle which housed most of the school activities, including the Benedictine Abbey. A greatly expanded student body, the lack of clear direction for growth, and a change in Monastic self-sufficiency gave impetus to the development plan. Unusual program requirements had to be followed, in that new development had to respect traditional ceremonies and ways of life. As a result Breuer established four land-use areas: the Monastic area; the scholastic, or student, area; a public function area, which contained Church, Library, classrooms and administration offices, and the Auditorium; and a service area for heating plant and related facilities.

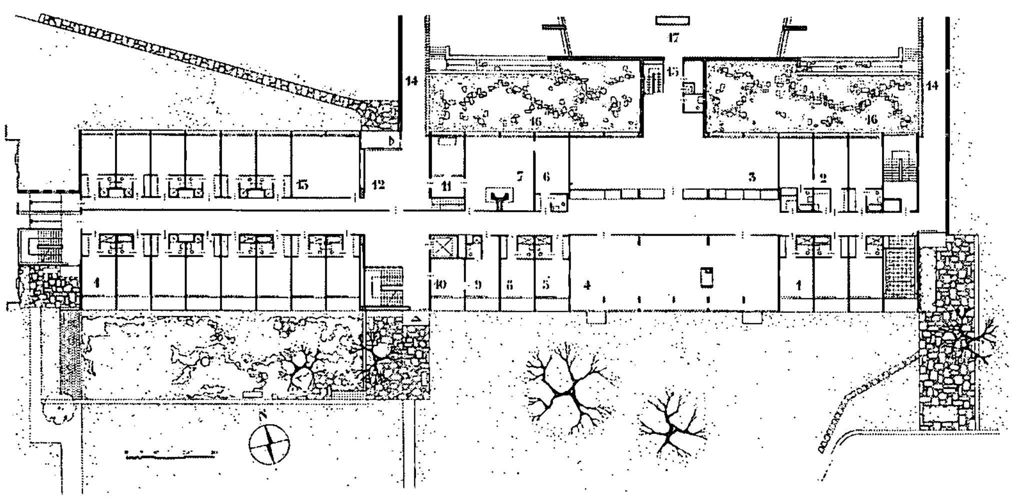
9B

The development diagram for the central area showing the steps by which Breuer would replace old buildings with new. The process is analogous to changing the bed of a river. Existing and essential communications could not be interrupted. "A new water course is created parallel and adjacent to the old, the stream is diverted to the new bed, and only then can the original course be altered."

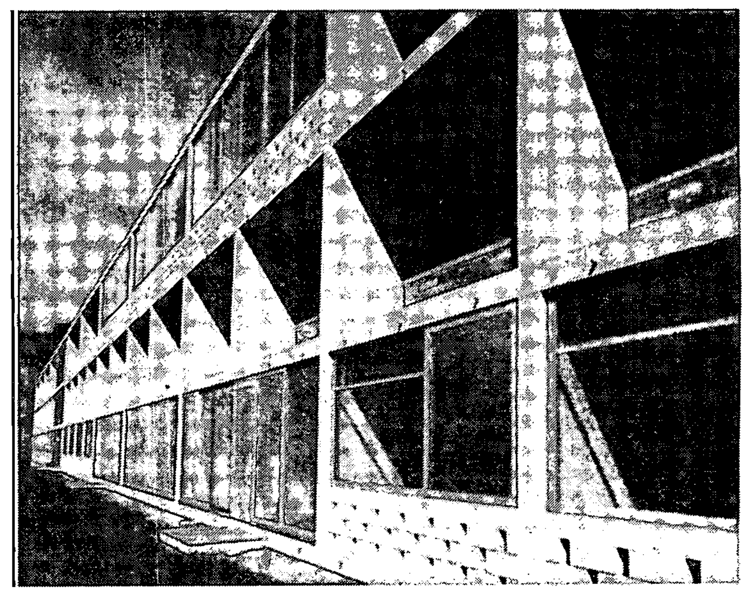
AIR PHOTO: LEE HANLEY



9C



9D



9E

9C

A. Approach Drive
B. Central Mall
C. Abbey Church
D. Monastery Wing
E. Existing Auditorium
F. Proposed Library

PHOTO BELOW BY WHITNEY STODDARD
OTHER PHOTOS BY SHIN KOYAMA

9D

Monastery Wing

Shown below is the first floor level of the monastic wing, with connection to the Main Church to the North. The interior functions of the wing are expressed in the long facade, revealed by the shape and spacing of the concrete structural members (see photo 9E). Concrete was chosen as a material because its weight and inertia and acoustical qualities "make for a quiet building."

Special attention was given to the routes of circulation that are necessary for carrying out Monastic rituals as well as a heavy teaching schedule. Outdoor cloistered areas and ground planes were designed with simple materials and unobtrusive patterns reflecting the traditions of the Order. Sun and shadow, natural and man-made textures were combined to bring into a single unity the outdoor and indoor areas.

9E

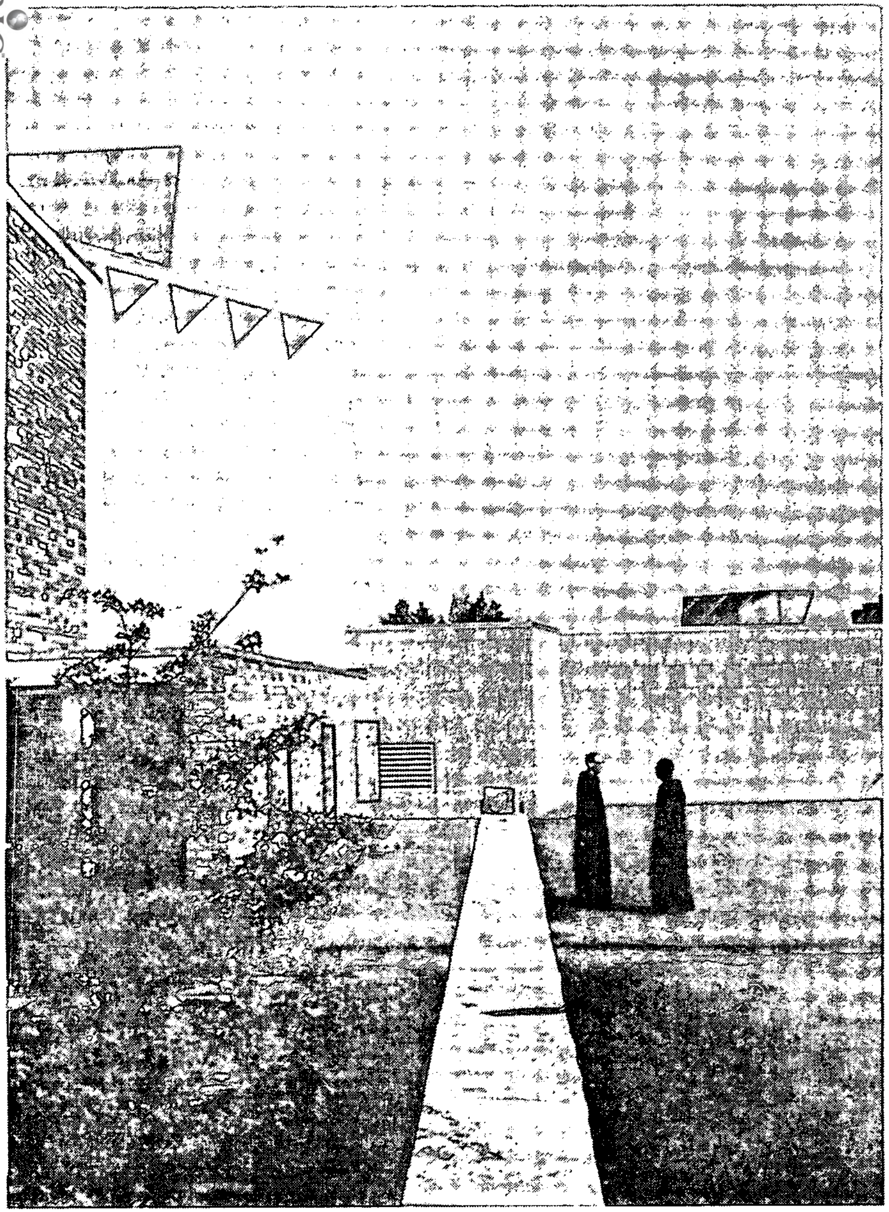
Facade

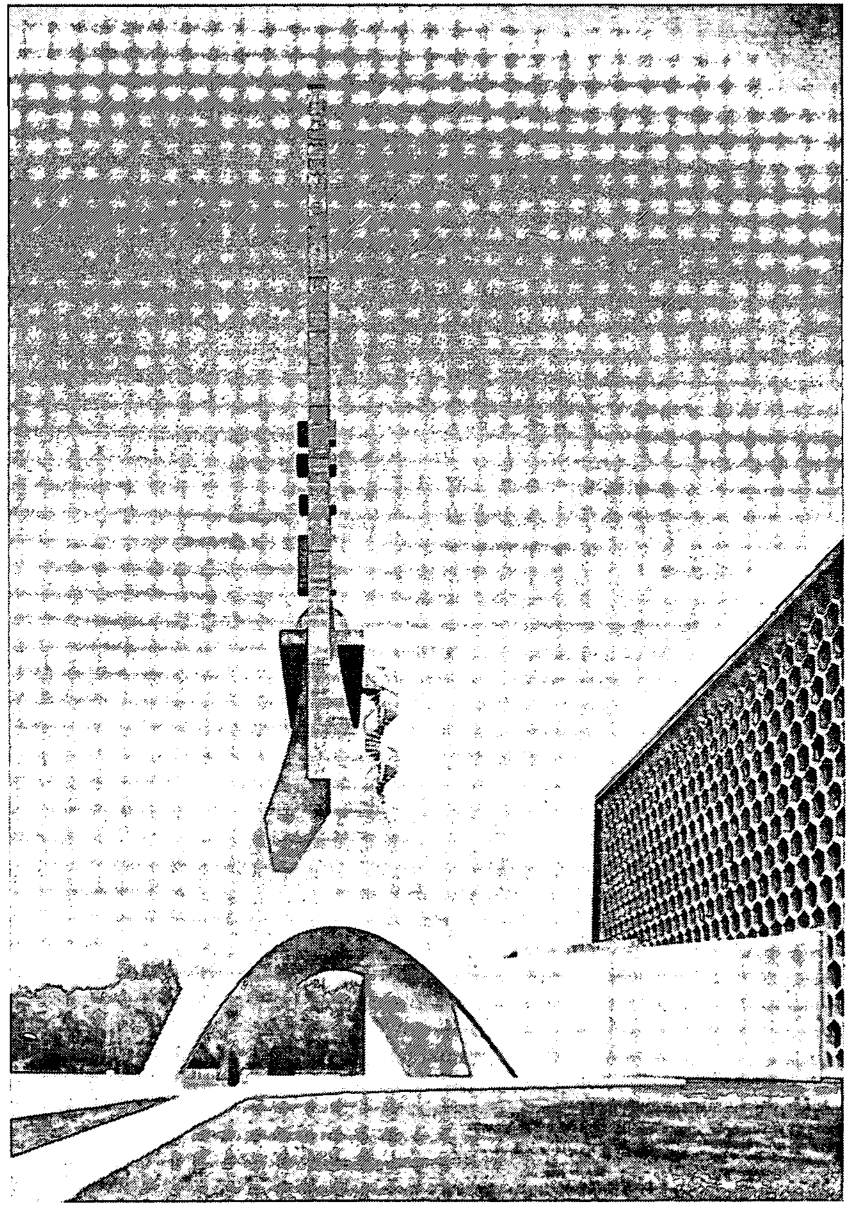
9F

Monastery garden

9G

Bell Banner, St. John's Abbey Church


9F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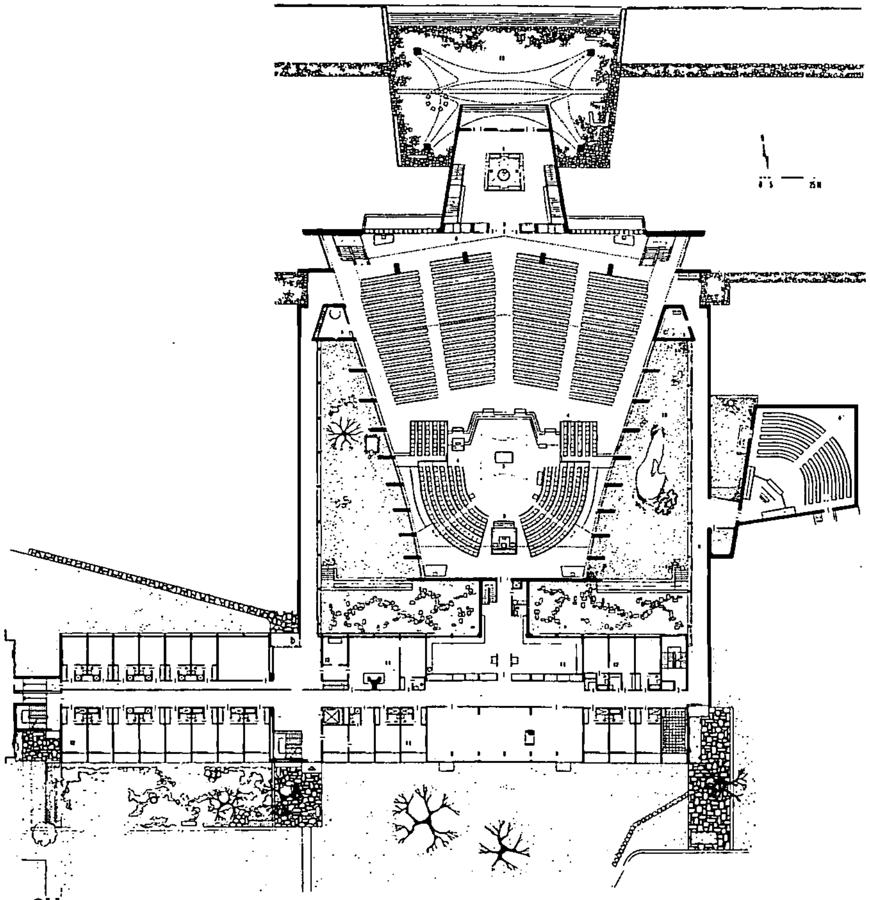
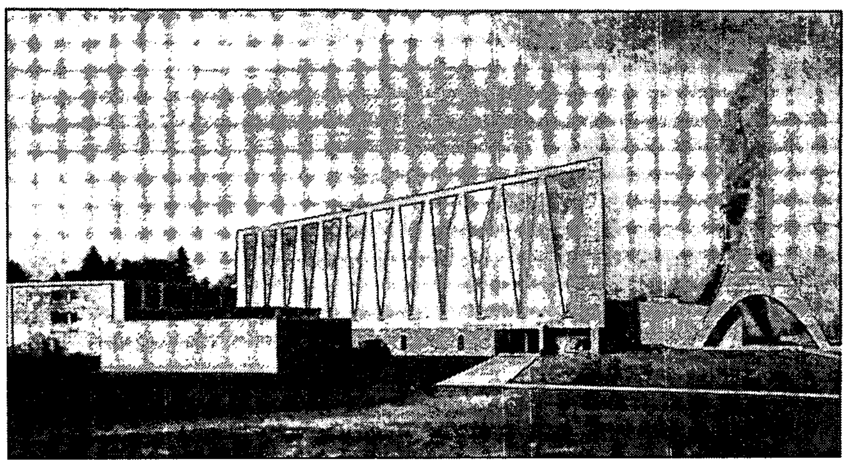


9H



9I

9H, I, J
St. John's Abbey Church

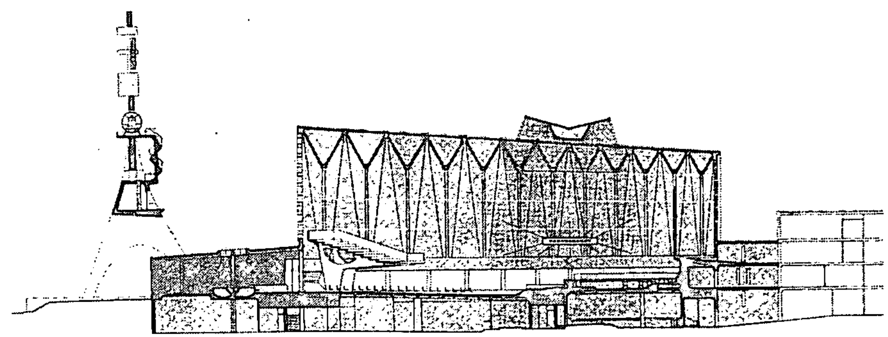
The unusual program requirements called for a Monastic Church that would accommodate 200 priests and 34 individual chapels for private devotions; a spacious sanctuary for Abbey ceremonies; a separate Chapel for the Brothers; a chapter house for monastic meetings; a main church for 1600 university students; and a separate Chapel for the preparatory school and parishoners from neighboring farms.

The program needs were meet in a bell-shaped plan. A large sanctuary surrounds the Altar, two halves of the choir fill the throat. To bring the congregation closer to the sanctuary, a free standing balcony is cantilivered over the nave. Reminiscent of an ancient atrium, a low structure stands in front of the main Church serving as a Baptistry.

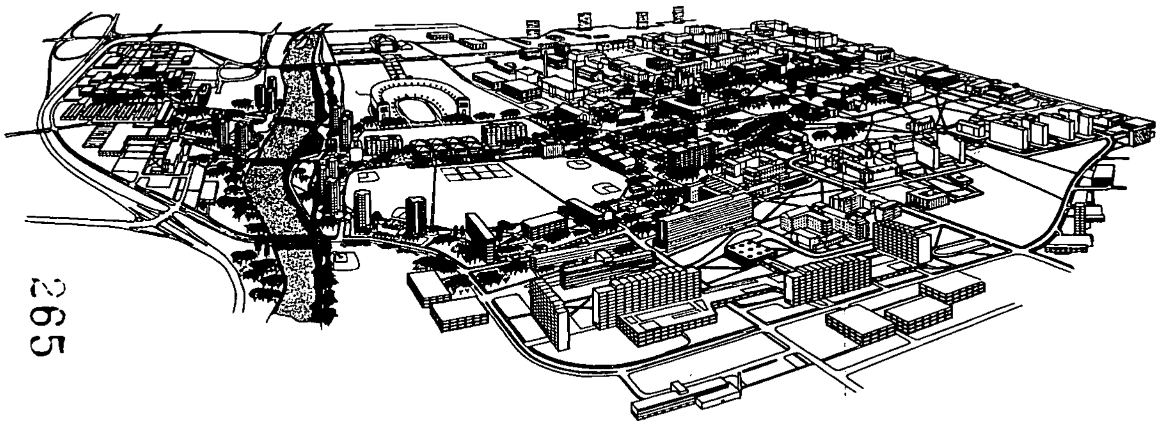
The traditional bell tower has been given contemporary form. The bell banner reflects natural light through the screening into the Church, and shelters an assembly-terrace at the main front door.

The structure is built almost wholly of reinforced concrete, which is left untreated and unadorned as an interior finish. The concrete shell encloses over a million cubic feet, with clear interior heights up to sixty-five feet and clear spans on the wide end of the bell over 150 feet.

PHOTOS: SHIN KOYAMA



9J



265

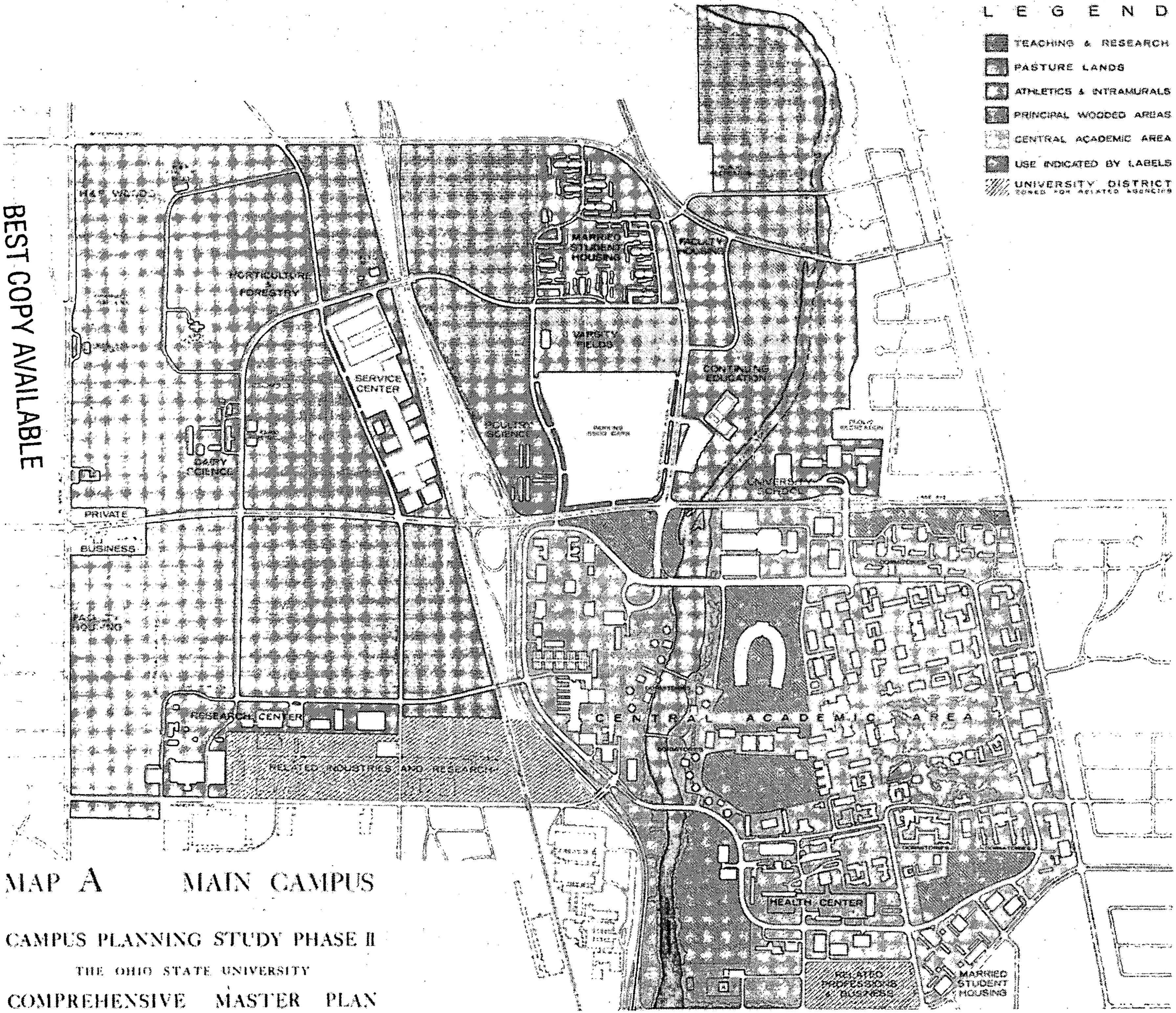
10A

10
The Ohio State University (1961)
Columbus, Ohio
Co-educational
Public Support
Spring 1962 enrollment: 25,167
Master Plan prepared by:
Caudill, Rowlett and Scott, Architects
Office of Campus Planning, The Ohio State University

10A
Perspective view of campus plan

10B
Air view campus (1962)
PHOTOS AND DRAWINGS COURTESY OF OHIO STATE UNIVERSITY

10B



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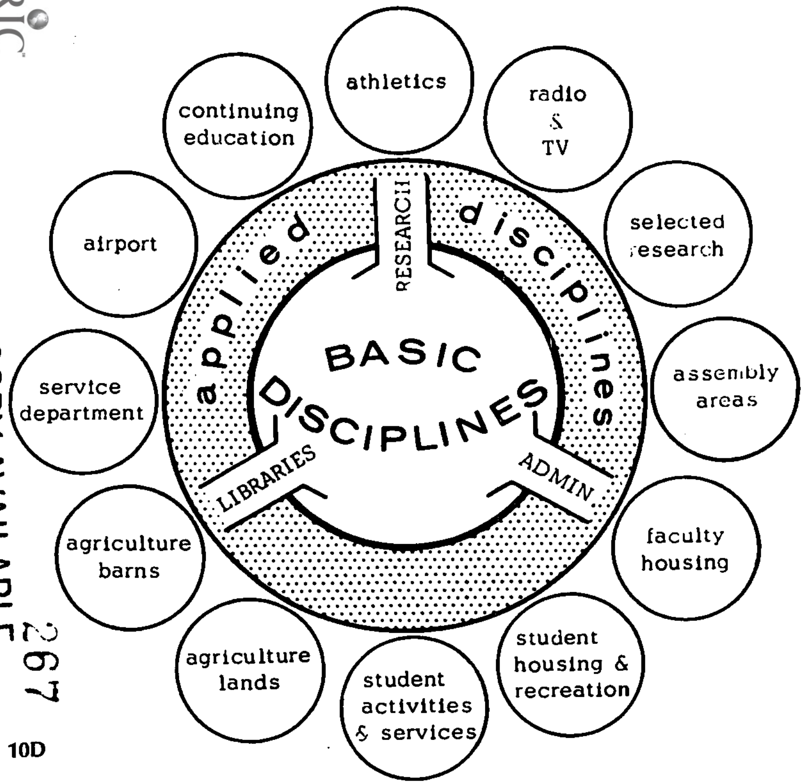
MAP A MAIN CAMPUS

CAMPUS PLANNING STUDY PHASE II

THE OHIO STATE UNIVERSITY

COMPREHENSIVE MASTER PLAN

10C



10D

10C,

This plan was prepared to guide the University in locating and arranging existing and proposed new facilities in accordance with program instructions. The program reflects a series of interviews with various members of the academic community. The plan placed considerable stress on establishing a workable circulation system and campus amenities.

The major goals of the plan are:

1. To unify campus development by locating dormitories, a branch of the union, and teaching and research facilities on both sides of the Olentangy River. (See air view of existing conditions.)
2. To promote academic efficiency by arranging land-uses in a manner that reflects the academic alignments between various parts of the University. (See diagramatic relationships, and the translation on the basis of actual site conditions.)
3. To create a pedestrian precinct in the form of a central campus area, free from through traffic.
4. To phase-out of the central campus those uses which would be better located at the periphery, such as parking, continuing education and service facilities.
5. To develop a series of design controls by establishing land reserves, density and open spaces standards to meet the long-range objectives.

10D
Diagrammed relationships and major academic groupings

10E
Staging plan for construction and demolition

On the eastern side of the river, the major new buildings paralleling the loop road will be devoted to agriculture and agronomy.

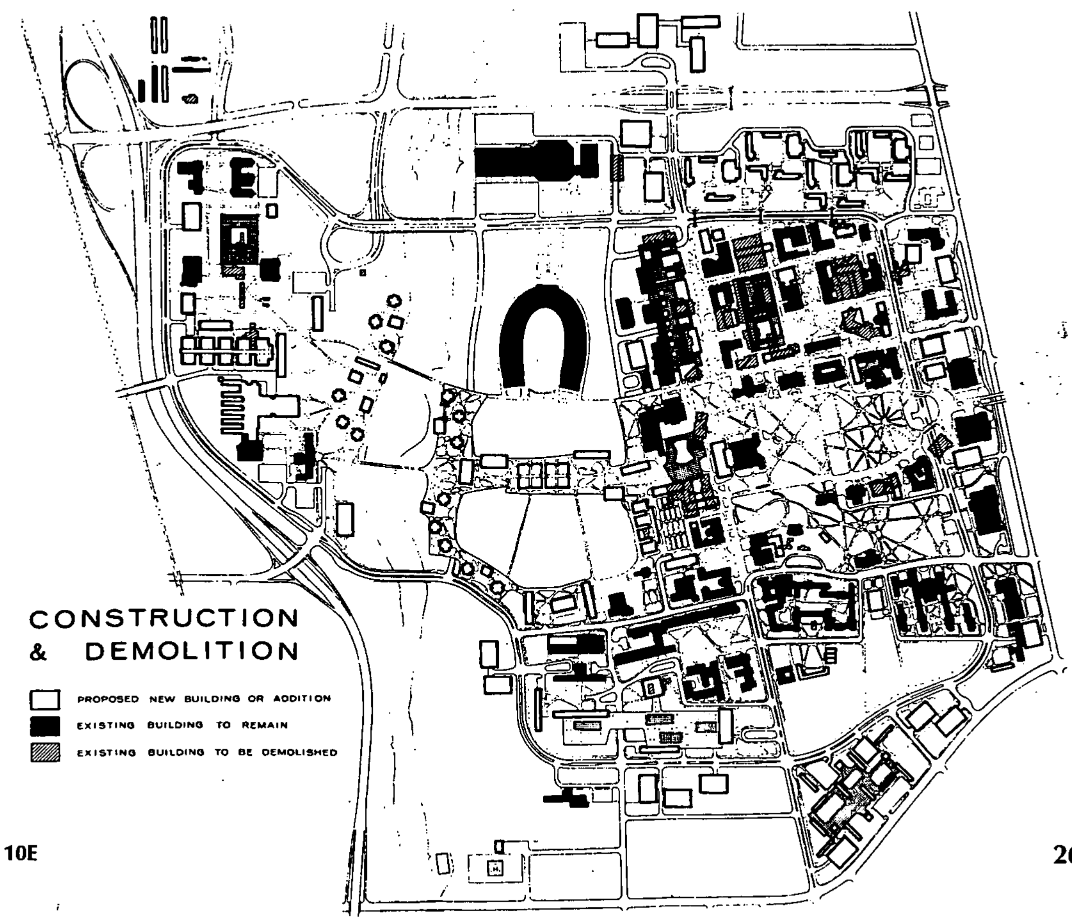
Proposed new dormitories are shown as towers on either side of river banks.

New undergraduate library is located just south of the open end of the horseshoe, along the major pedestrian axis connecting both sides of the river.

The major decanting process will occur in the northeastern section of the campus. New physical science and engineering buildings will gradually replace existing facilities.

Married student housing is scheduled for construction in the southeastern sector.

Another major dormitory complex will be constructed in the northeastern portion of the campus, just outside the loop road.



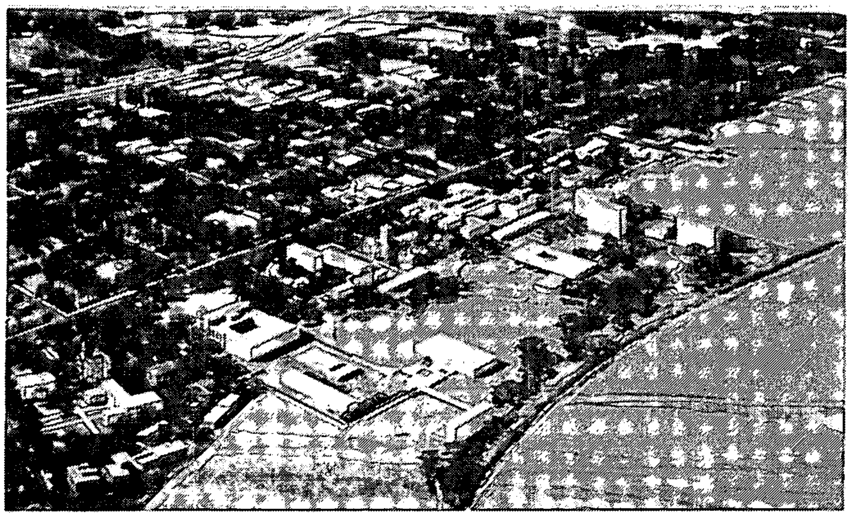
10E

11
Lakefront Development, Northwestern University, Evanston, Illinois (1961)
Architects: Skidmore, Owings, & Merrill

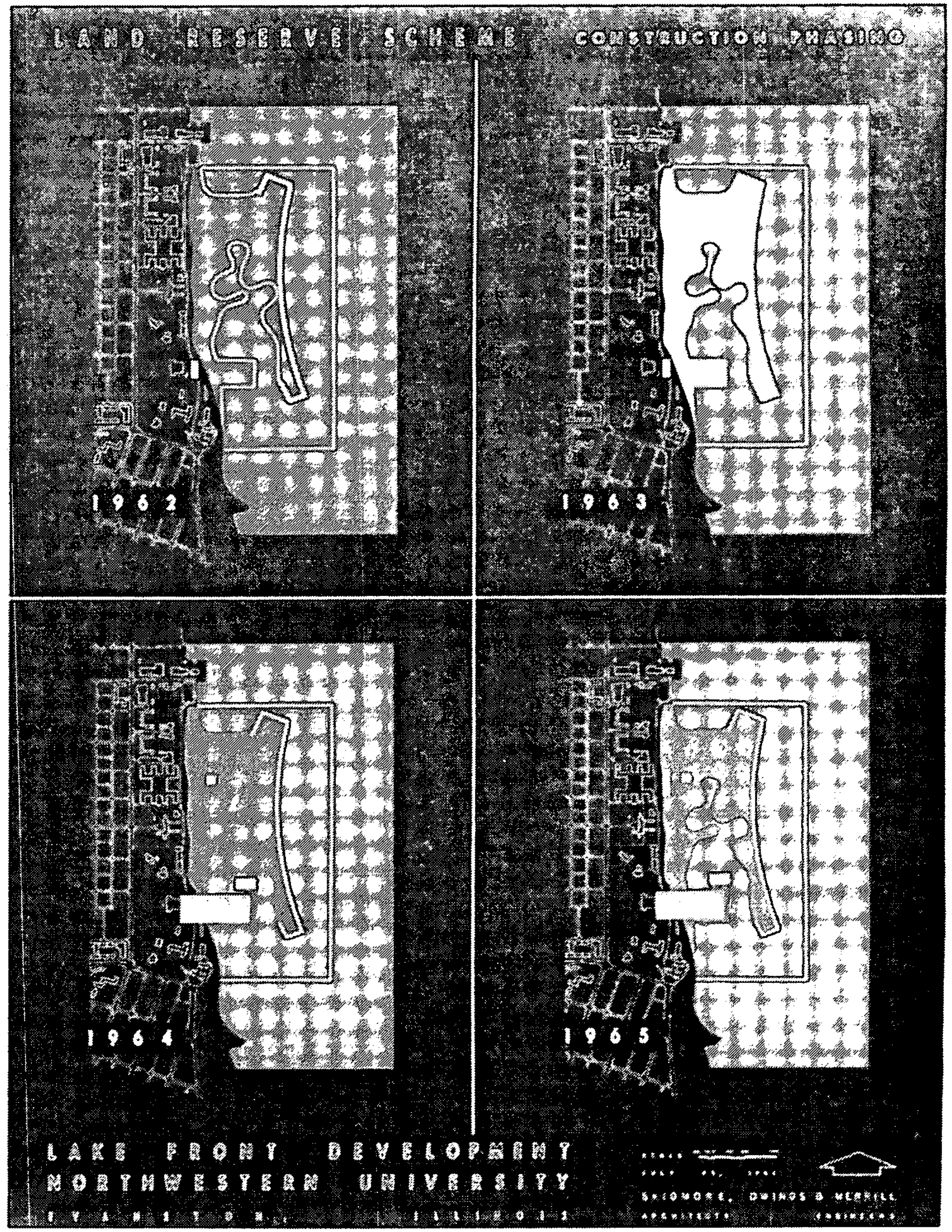
Like many urban campuses Northwestern found the opportunities for expansion of its 86 acre campus restricted by the high cost of land acquisition – up to $350,000 an acre, if land could be purchased. What was considered a natural barrier, however, has been converted into an unusual asset. The reclamation of a portion of Lake Michigan will total 65 acres at a one-fourth the acreage cost and provide for the extension of the campus without removing land from the Evanston tax rolls.

11A
Preliminary massing study of proposed new buildings along the lakefront and their integration with existing buildings.

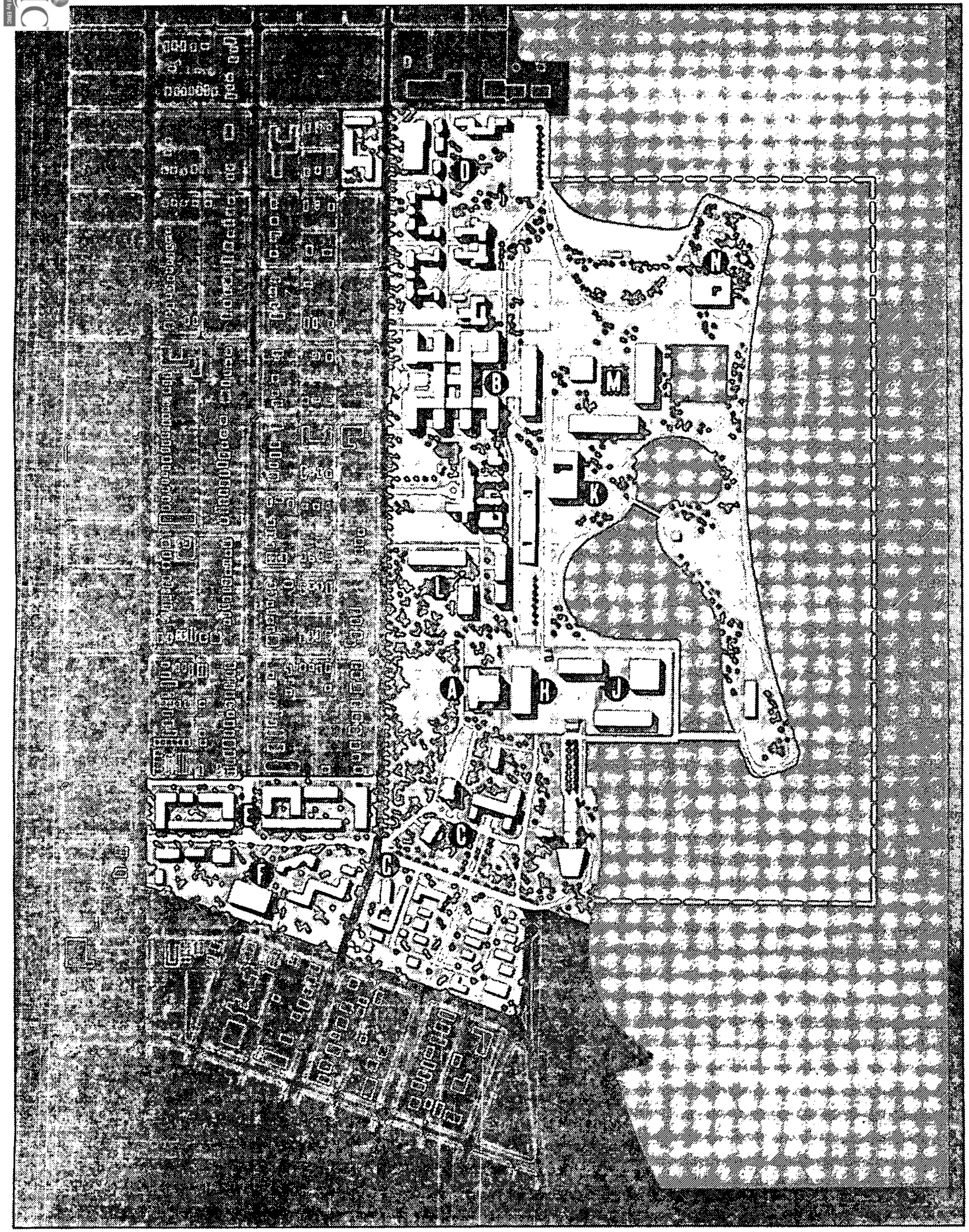
11B
Preliminary studies showing four steps in preparing land for eventual construction.



11A



11B



11C

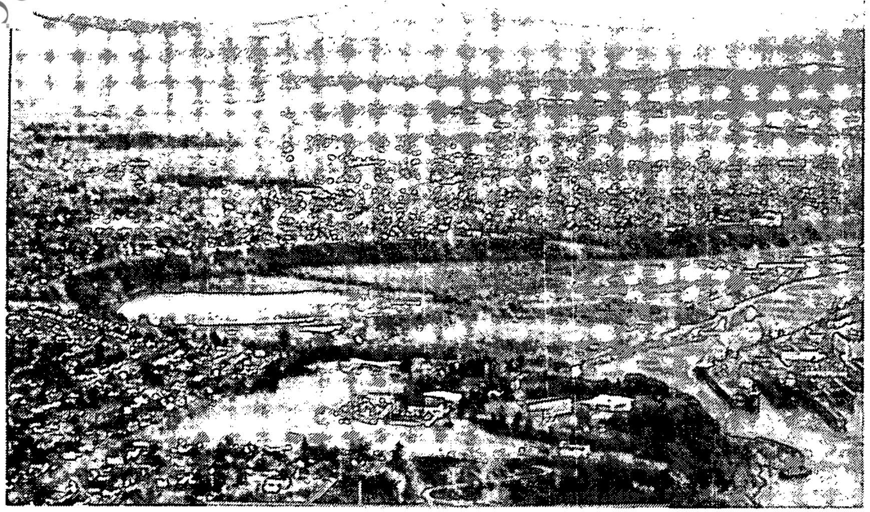
11C
Final site plan:

Existing buildings:

A. Deering Library
B. Technological Institute
C. Liberal Arts
D. Men's Housing
E. Women's Housing

New buildings:

F. Administration Building
G. Chapel
H. Library extension
I. Fine Arts Complex
J. Student Activities Center
K. Business School
L. Science Complex
M. Observatory



12A

12
University of Portland (1957)
Portland, Oregon
Co-educational
Sectarian
Spring 1962 enrollment: 1,215
ALL PHOTOS COURTESY OF THE UNIVERSITY DEVELOPMENT PLAN PREPARED IN 1957 BY GEORGE EBY ASSOCIATES

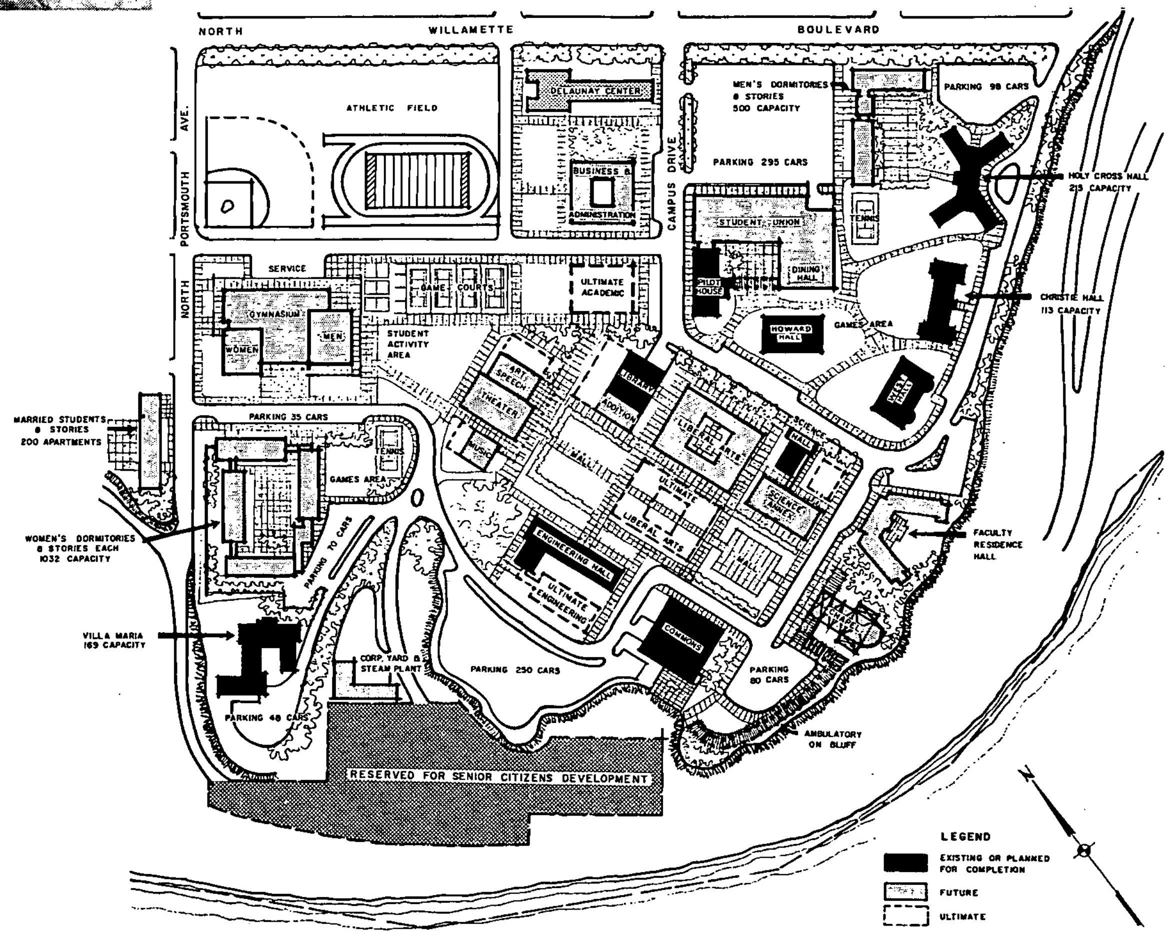
12A

The University occupies a 90 acre site overlooking the Williamette River, with a view to Mt. Hood sixty miles away. The campus has grown in haphazard fashion, and reflects a variety of styles in architecture. Some of the natural beauty along the river is scarred by industrial activity.

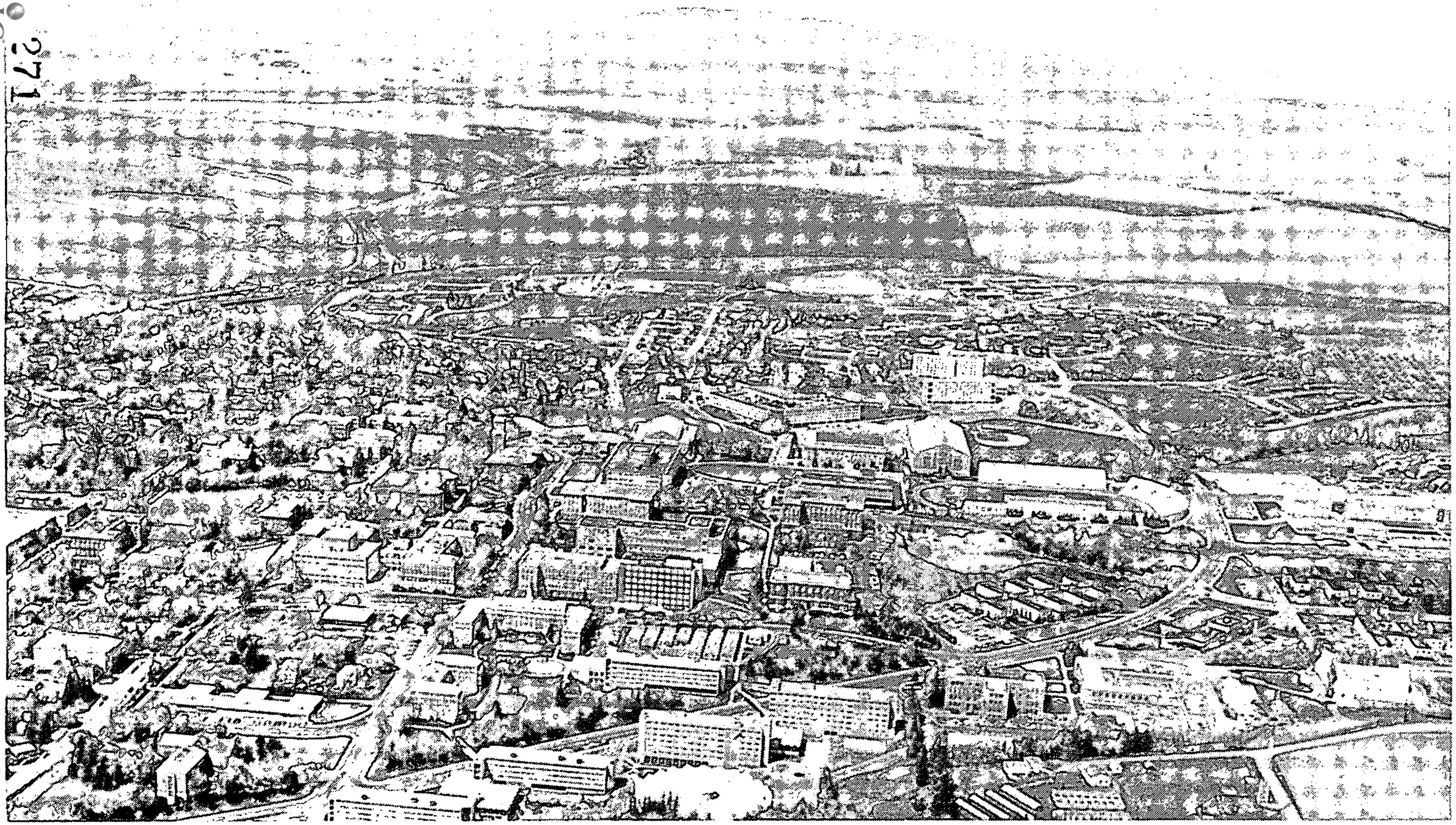
12B

The development plan is based on a day-time enrollment of 3,000 students. A central academic area comprises the heart of the campus, on the high ground. Housing will be clustered on either side. Expansion beyond 3,000 is shown on the plan as reserved sites (ultimate).

An interesting feature of the plan is the site area planned for a senior citizen's development. A 24 story retirement home is proposed, with 413 apartments. The development is intended to offer facilities for those desiring to maintain close ties to a university community, or even continue teaching and research on a part-time basis. By purchasing an apartment and paying a fixed monthly fee the tenant receives meals, maid service, infirmary care, the use of recreational areas, chapels and institutional facilities.



12B



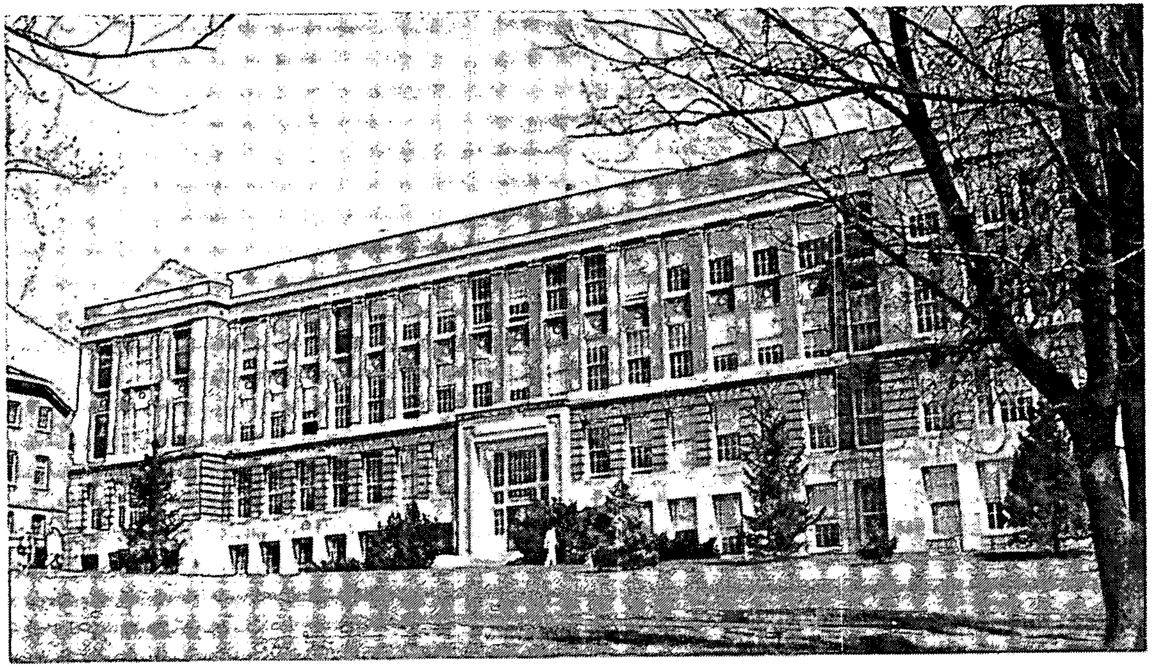
13A
Washington State University (1961)
Pullman, Washington
Co-educational
Public Supported
Spring 1962 enrollment: 7,311
All photos and drawings courtesy of
University Architect

The long-range plan is based on an enrollment of 15,000 students. Precise land use and building requirements beyond 1970 have not yet been measured. The campus planners intend for growth to occur in "wagon-wheel fashion" outwards to the perimeter.

As can be seen in the air photo, campus buildings are generally dispersed. First stage expansion will be achieved by filling in between existing buildings or adding new wings to old structures. Long-range overspill can take place on both sides of Stadium Way. The stadium itself (right center of air view) serves as a major release valve, since it will be relocated elsewhere.

Housing units are now located to the south and north of the central campus in high hise facilities. It is expected that these sites will also accommodate future construction for this function. It is hoped that parking can be gradually removed from the central campus area and the number of through streets reduced so as to create an automobile-free precinct.

The dispersed quality of the campus and the changes in topography are both handicaps and opportunities. The success of the plan will depend on how well the larger site complexes are developed and connected to one another, and whether or not the present cutting-up of sites by streets, small parking lots and temporary buildings can be overcome by a strong precinctual development. This may require the same boldness in site development as the University has shown in its new architecture.

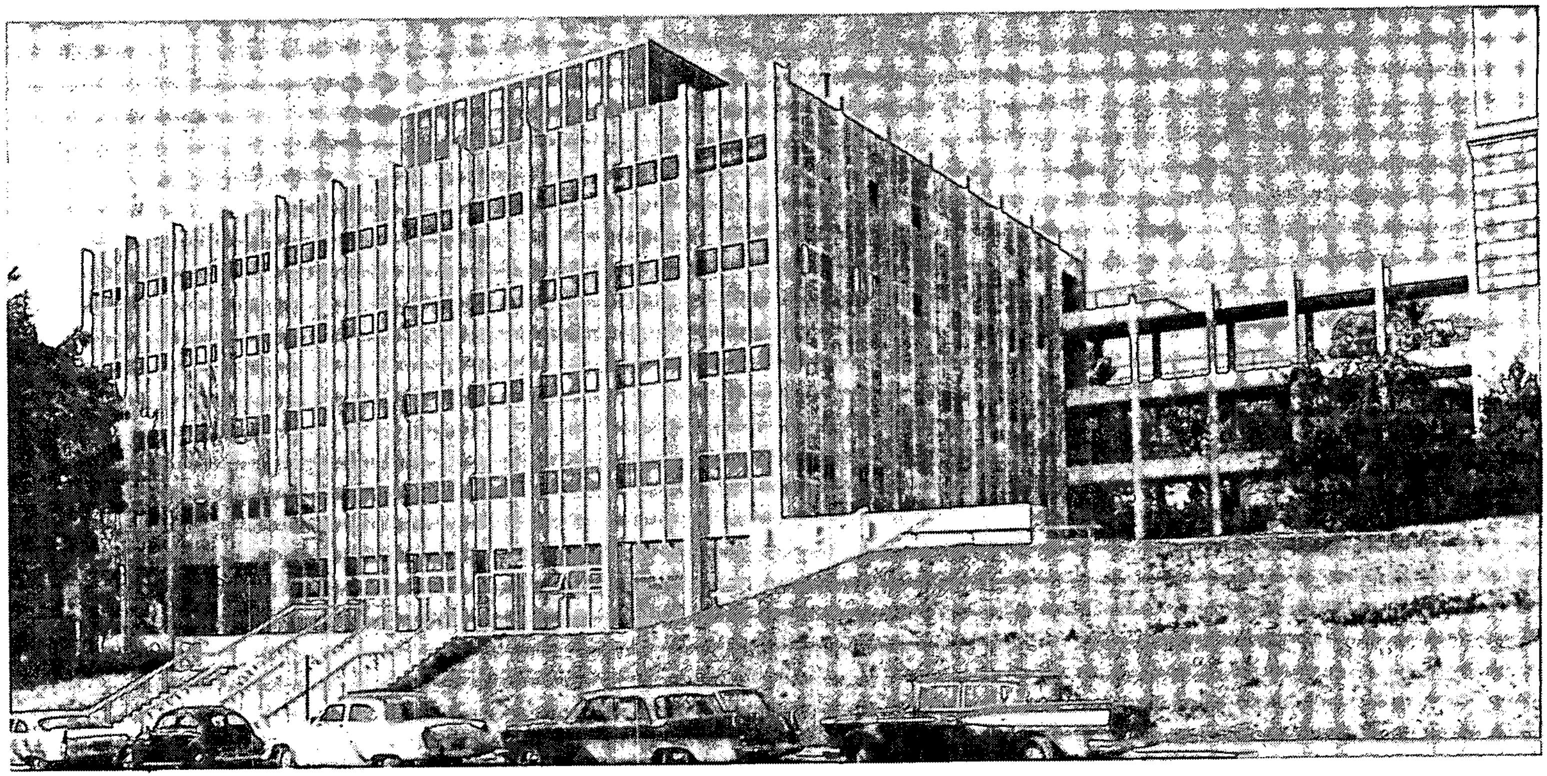


13B

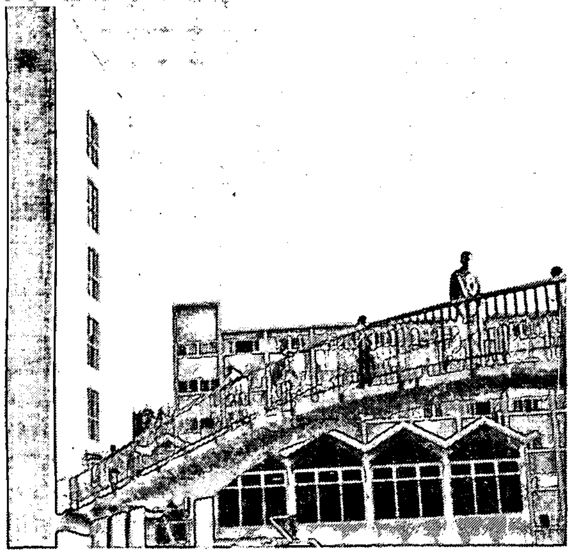
13B, C

In expanding by filling-in between buildings the University faces the problem of respecting older architectural styles and at the same time being true to contemporary design convictions. See photo 13B: Science Hall (1935). The building contained Bacteriology, Botany and Zoology Departments, each on one floor. It was felt that horizontal expansion was desirable. Each department could then retain space they had in Science Hall, reusing all existing facilities with little or no change. Such expansion would save considerable costs in the remodeling of existing facilities for use by a new department. Expansion was achieved by constructing a new building (Heald Hall) and tying the space there into the older facility by means of outdoor bridges. Further expansion to the north (post 1975) can be achieved in the same way, and a site has been reserved for such a possibility. This applies the wagon-wheel principle on a smaller scale.

13C
Heald Hall (1962)
Architect: Ralf C. Decker



13C



13D

13D, E

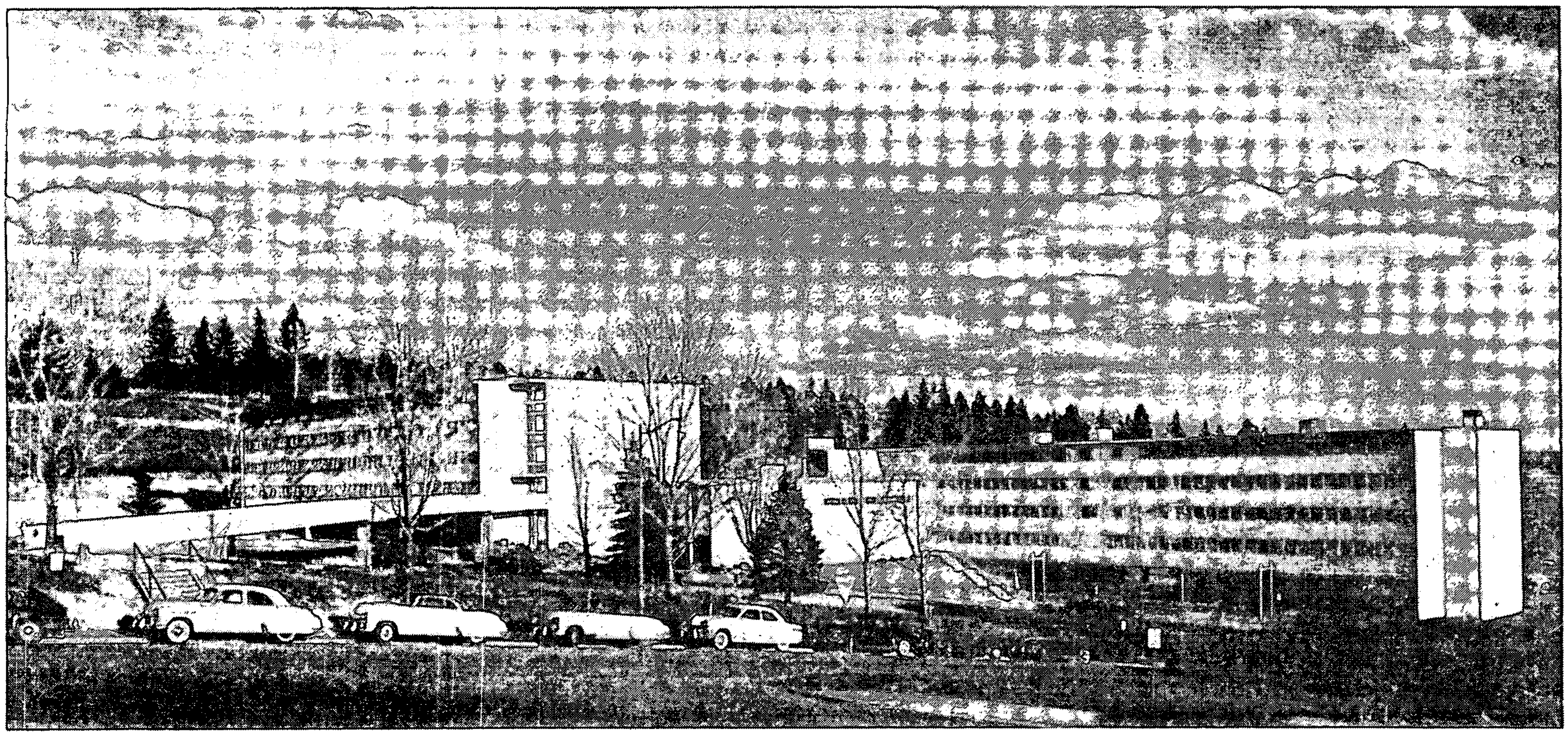
Rolling topography imposes special requirements on site planning. Connections between one level and another can be designed for comfort, convenience and aesthetics. The bridge shown in the handsome dormitory group above carries pedestrian traffic over Stadium Way.

13D

Another pedestrian bridge over the same street.

13E

Dormitory grouping: Kruegel-McAllister Hall (1957)
Architects: Jones, Lovegren, Helms, Jones



13E

14

University of Rhode Island (1960)

Kingston, Rhode Island
Co-educational
Public
Spring 1962 enrollment: 5,531
General Development Plan 1960
Plan prepared by: Sasaki, Walker & Associates, Inc.

In 1959 studies by *State of Rhode Island and Providence Plantation Commission to Study Higher Education* pointed out that as public and private schools outside of Rhode Island became obliged to restrict enrollments to residents or to capacity of plant, more and more students in the state would have to be accommodated by the state institutions. Preliminary estimates concluded that 13,000 Rhode Island students would have no facilities to attend in 1980 unless immediate action was taken by the state. This placed a serious and heavy burden on all of the State's institutions, but in particular on URI which had just begun to mature from a college to a university.

In getting ready for the surge, the University of Rhode Island was fortunate in many respects in having recognized long ago the intrinsic worth of planning a suitable environment for learning. Its generous grounds and well sited buildings served well through 1945. Given a more leisurely opportunity to expand, there would be every reason to expect beauty and utility to grow hand in hand. But increasing enrollments since the end of the war and the University's change in stature had accelerated the construction of facilities, unfortunately without recourse to careful consideration of site and functional needs. As a result the University today faced two serious problems. The first was the need to bring back into balance the environment for learning so crucial to the academic life. The second was the crisis of the future: how to prepare a development plan so that all new construction would be in consonance, not conflict, with predictable development goals.

In specific terms the following problems needed resolution:

1. *Building Sites:* Sites for over twenty new major facilities totalling nearly one million square feet of new construction had to be found on the central campus so the University could provide facilities for an enrollment of 6,500 students. The sites had to be carefully related to existing academic buildings as well as to the central core areas such as the library, administration offices, student union and on-campus housing.

2. *Field Needs:* The University expansion space for field areas—both agricultural research, physical education and recreation—was in the paths of the most desirable academic and residential expansion.

3. *Replacement of Temporary Buildings:* The continued use of temporary facilities in war-time sheds and barracks became increasingly incompatible with the university's educational purpose. These buildings were difficult to maintain and poorly located for servicing. Their replacement was necessary if only to increase the morale and efficiency of those using the structures.

4. *Circulation:* The existing circulation system within the campus was cumbersome, inefficient and below standards for the volume and kinds of traffic it carried. There was a potentially dangerous intermixture of vehicular and pedestrian traffic. Parking space, as in all American universities and colleges, was in short supply The situation at URI was aggravated by the need to provide facilities for the third of the University which commutes daily without recourse to mass transportation. Improvements had to consider the future circulation requirements, for the front door of the University would shift one hundred and eighty degrees when an important state highway was relocated to the north.

5. *Coalescence of Land Holdings:* The University had to protect itself from the possible encroachment of incompatible uses by acquiring land to fill out its holdings north, south, east, and west.

6. *Housing:* Housing problems were those of degree and those of kind. It was expected that the environs would provide less housing in the future. Decisions about the nature and composition of on-campus housing received special attention from the University. In addition, there are several site problems with existing facilities. Some sororities and fraternities occupied key expansion sites in the campus core.

7. *Campus Amenities:* Expediency and restrictive wartime development budgets impaired and diluted the older amenities. The extended use of temporary surfacing materials on walks and roads, the destruction of planting for building construction without replacement, the loss of some plant materials because of blights and diseases, the spotting of "temporary" sheds in prominent locations, and poor drainage in the marsh areas between the housing and gymnasium made many parts of the campus shop-worn and shabby. A conscientious and consistant program of renewal was urgently needed.

8. *Functional Cohesiveness:* Buildings constructed since the war without benefit of a development plan or site planning advice created awkward situations for academic expansion. As much as possible the development plan had to bind these facilities together to create a series of logical building groupings. These were to be so sited that no end of the academic group was further than ten minutes walking distance from the other end. In addition a suitable pedestrian circulation system was devised to channel traffic safely back and forth between various academic subsections.

9. *The Environs:* The University in some respects was fortunate in being located in a semi-rural area without central city problems of blight, heavy traffic, obnoxious uses and limited opportunities for expansion. The University had an obligation, however, to the town in that area of the campus which abutted an historical district. The preservation of the general amenities and appearances here was essential for good town-gown relations.

To help resolve some of these problems a seven phase work program was undertaken and then summarized as a development plan. The work program consisted of:

1. Identification of the size and volume of future construction, field space, and parking requirements.

2. Establishment of use-areas in conformance with long-range academic goals.

3. Selection of sites for imminent construction and the reservation of sites for long-range construction.

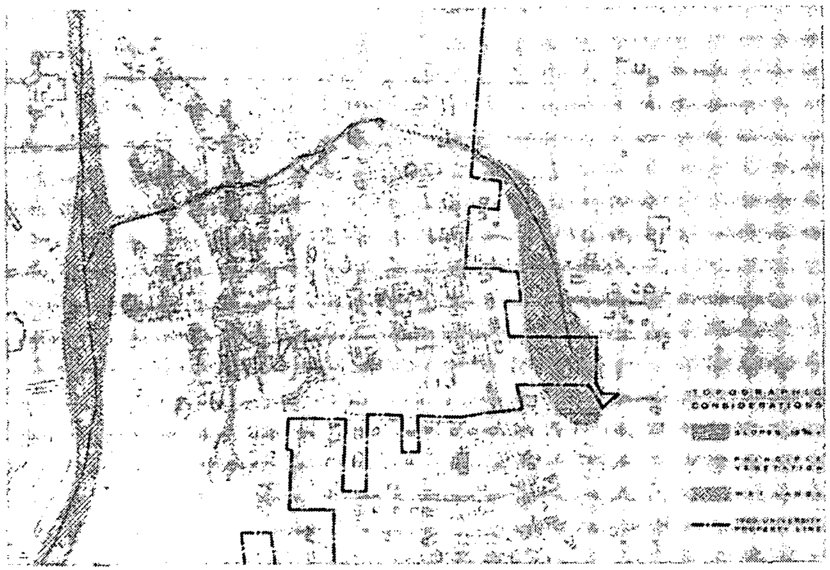
4. Establishment of a campus design structure through the realignment of the major circulation systems and the arrangement of land uses.

5. The staging of improvements to allow a gentle and economical transition and realignment to occur among the various land uses; and so that each new construction increment began to add to the campus design structure.

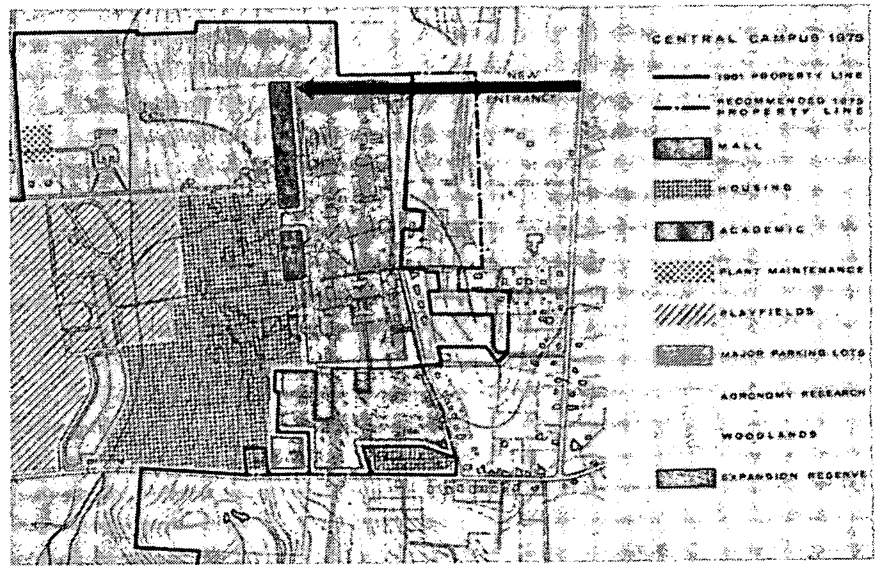
6. The identification of priorities in development of campus amenities, beginning with the creation of a core area.

7. The establishment of a logical system for making revisions in the plan as conditions and circumstances change during the period of implementation.

14



14A



14B

14A
Site Considerations

Early planning studies determined four general use areas on campus on the basis of topography and natural building zones. From east to west these zones were: a plateau on which the academic buildings were sited; a slope area which was designated for residential construction; playfields at the foot of the slopes; and finally the agricultural research plots. The 1960 study re-examined these premises and in addition studied physiographic features which might help determine future building areas as well as impediments to expansion. The soundness of the early land-use decisions were re-confirmed, except that the early planners had no notion as to how large the university might become, and as a result there was limited expansion room in the central area, though generally quite generous land holdings in other parts of the University.

Site conditions were identified—as obstacles to be overcome or natural elements to be incorporated in the campus design. As shown in the development plans, the wetland conditions were capitalized on to form a recreational pond between the residential area and playfields, close to the gymnasium. Existing vegetation was selectively thinned and organized into formal plant groupings to reinforce the campus design structure; or left in informal groupings as an embellishment of outdoor space.

14B
Land Use Diagram

On the basis of program studies, the campus land uses were rearranged to allow:

1. Gradual relocation of athletic and agricultural field space in central campus to the periphery.
2. Realignments of academic uses in central campus so as to bring together various departments into related disciplines: engineering, humanities, sciences, professional schools.
3. Creation of a University core (library, student union and administration building) between academic quadrangles and housing area. Shown on page 193 and as core above.
4. Relocation of plant maintenance from central campus to periphery.
5. Reorganization of campus circulation system to create a pedestrian zone in the heart of the campus (see page 193). (Expansion needs for academic uses beyond 1975 are also indicated above, as well as probable location of new entrance road.)

14C
Major Circulation Goals:

1. Completion of automobile free central campus zone.
2. Removal of through traffic from central campus, and at the same time, the changing of existing roads into pedestrian routes and service drives in central campus.
3. Creation of loop road around central campus in anticipation of new entrance to the campus from the north.
4. Construction of large parking lots outside central campus, but linked to the major loop road.
5. Phasing of change so new buildings will be adequately serviced when opened for use.

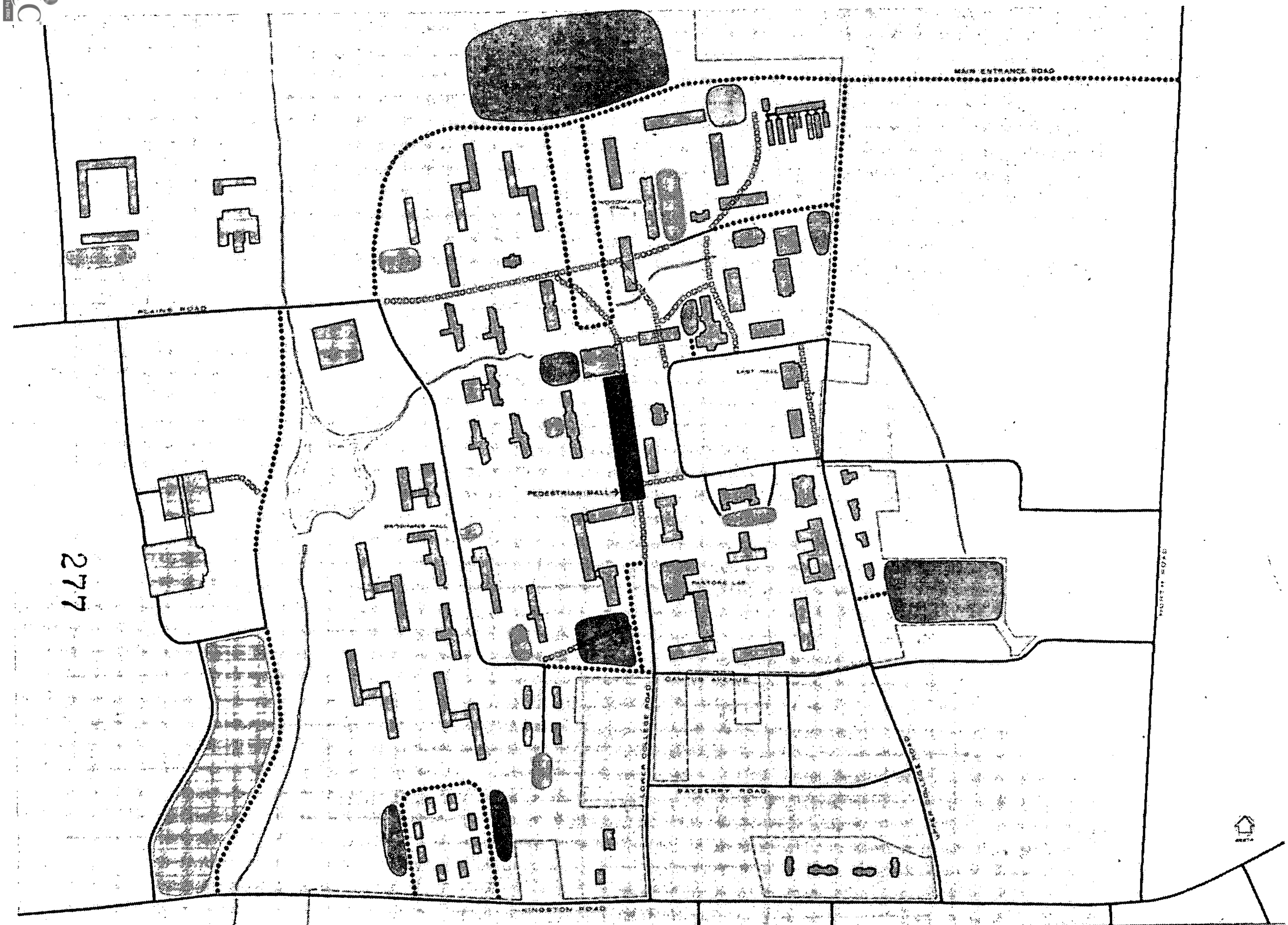
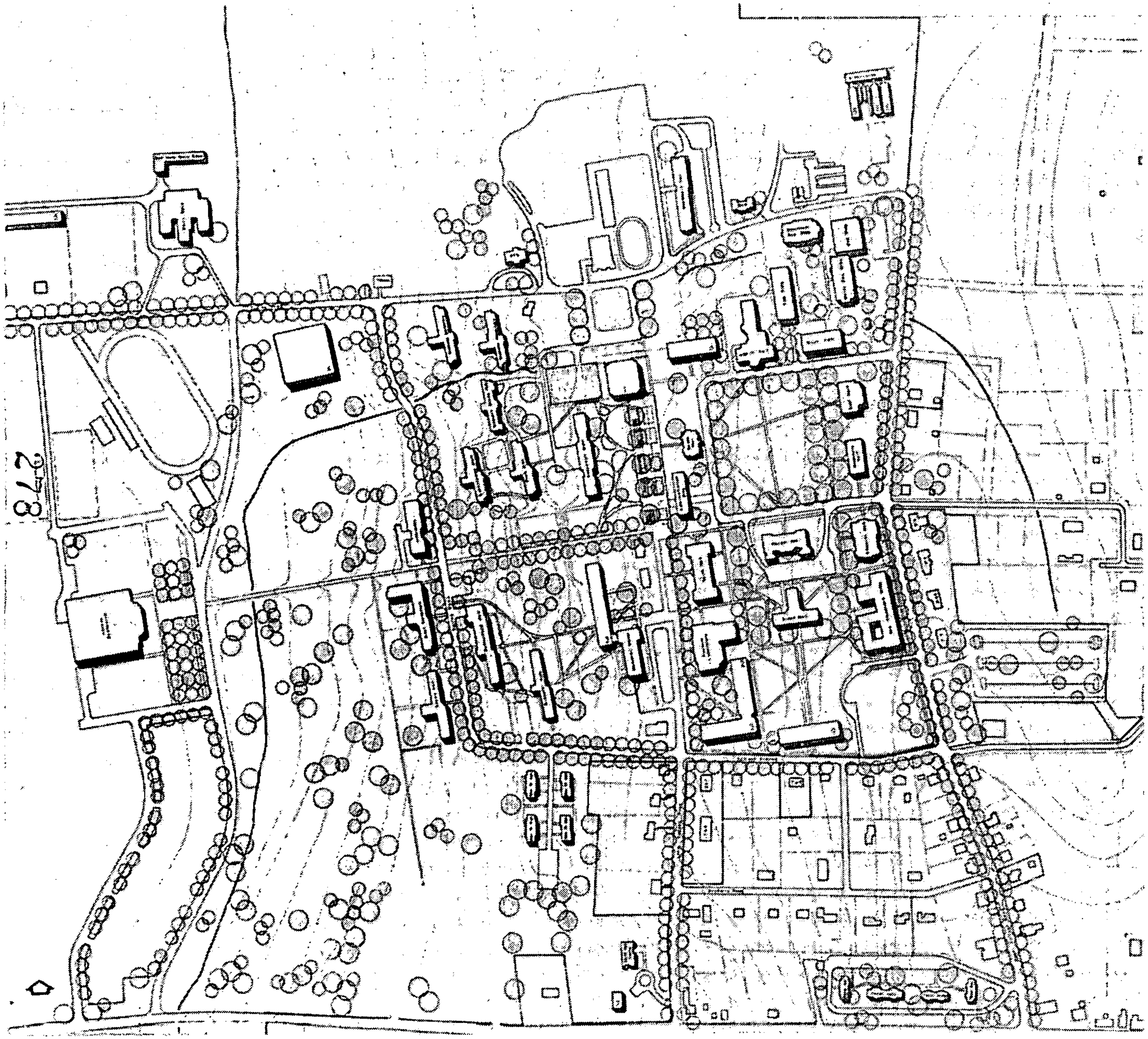


DIAGRAM OF PROPOSED CIRCULATION PATTERN 1975

EXISTING ROADS TO REMAIN
EXISTING PARKING LOTS TO REMAIN
EXISTING ROADS TO BE REMOVED
1975 BUILDINGS
PROPOSED ROADS – COMPLETED BY 1975
PROPOSED PARKING LOTS – COMPLETED BY 1975



PHASE I

BUILDINGS

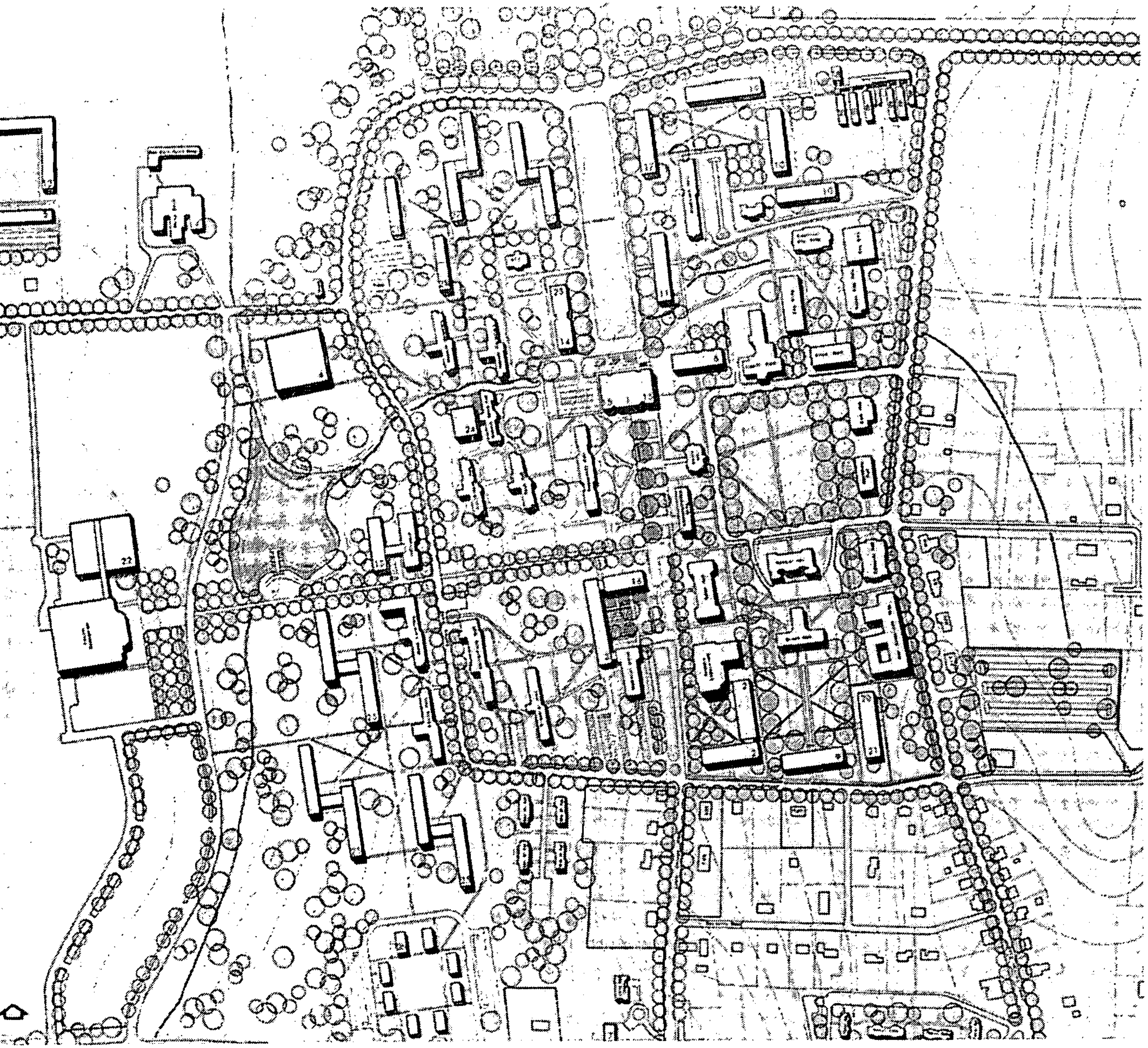
1 Library
2 Health Science Bldg.
3 Addition to Union
4 Women's Gym
5 Service & Maint. Bldg.
6 Classroom - A
7 Home Management House
8 Additions to Agriculture
9 Classroom - B

Existing Bldgs.

Phase I Bldgs.

14D
Phase 1 Plan

During this period the main entrance to the school will be from the south. Major additions consist of the construction of the core area with the opening of a new library and expansion of the student union. Classroom building A (above) will help complete the older quadrangle. Women's gymnasium will be relocated from central campus to a location close to both women's residential units and playfields. A second academic quadrangle will be started to the south.



PHASE II

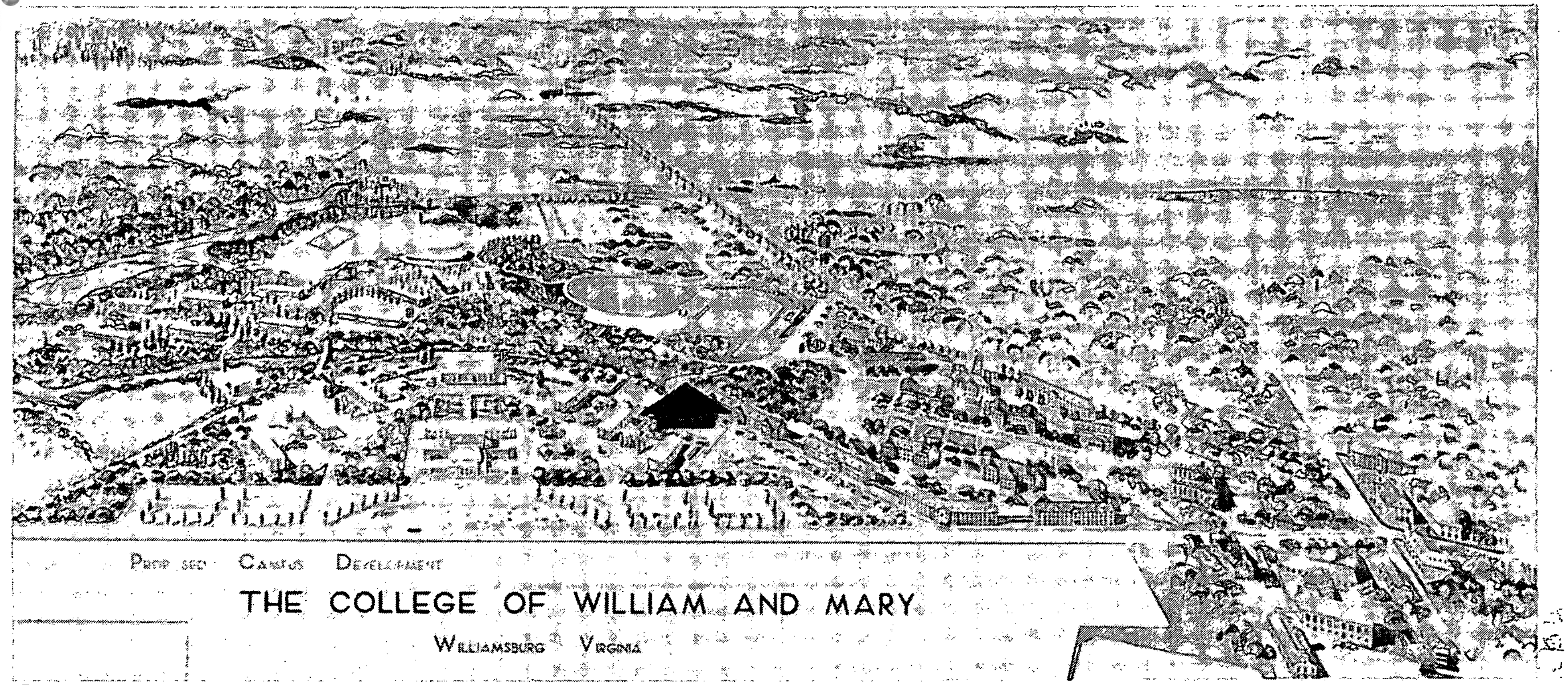
10 Laboratory Bldg.
11 Classroom - C
12 Maintenance Bldg.
13 Addition to Infirmary
14 Admin. Off. for Student Sve.
15 Addition to Library
16 Addition to Student Union
17 Classroom - D
18 Addition to Agri. Bldgs.
19 Laboratory Bldg.
20 Classroom - E
21 Addition to Health Sc.
22 Addition to Men's Gym
23 Admin. Bldg.
24 Dining Hall Addition
25 Men's Dormitories
26 Fraternities
27 Women's Dormitories
28 Sororities

Existing & Phase I Bldgs.

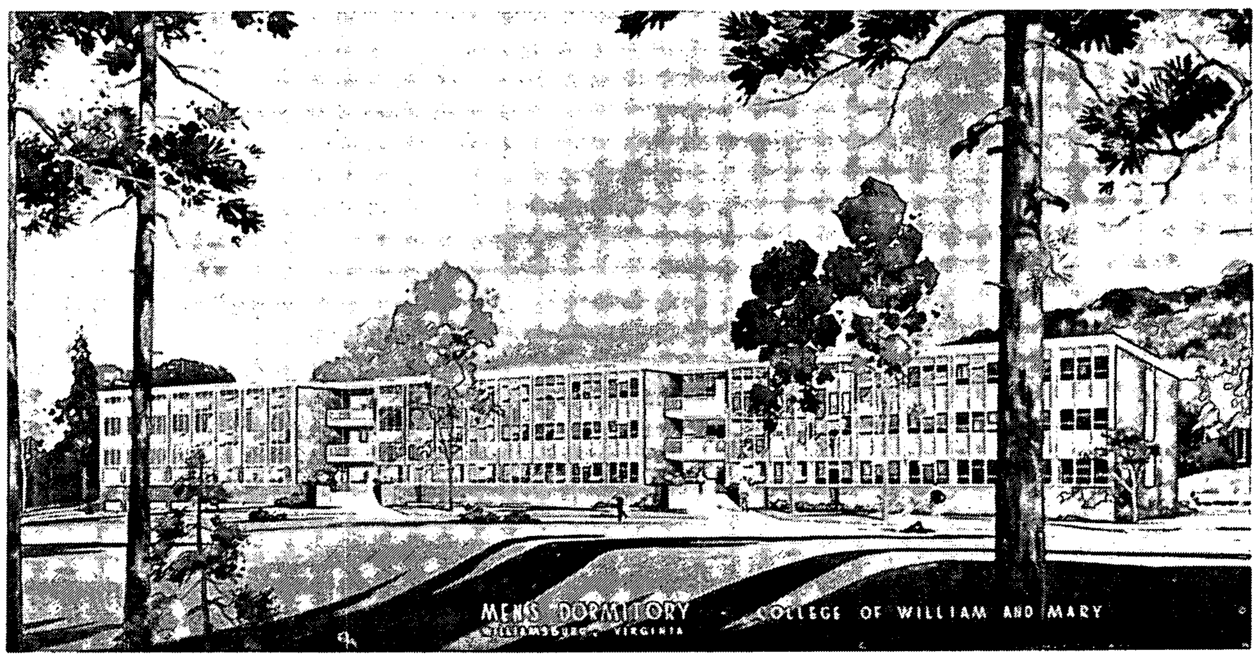
Phase II Bldgs.

14E
Phase 2 Plan

During this period the main entrance to the school will come from the north. The loop-road system around the central campus will be completed. The southern academic quadrangle will be filled in, and a third quadrangle completed to the north. Residential expansion will be accommodated north and south of existing units. The library will expand on its own site. Plant maintenance shops will be relocated, a swimming pool added to the men's gymnasium, and the campus pond completed. Further expansion, not shown, might be accommodated by replacing parking lots with buildings, or acquiring additional land to the east to start a fifth academic precinct.



15



15A

15
Proposed Development Plan
College of William and Mary
Williamsburg, Virginia
Wright, Jones and Wilkerson, Architects

The major design consideration in the plan is the construction of new campus facilities in contemporary styles, rather than in Neo-Georgian.

15A

Proposed men's dormitory (235 students) is typical of the design transition being considered for the areas left of the arrow in the plan above.

7. Urban Renewal and Campus Expansion

SECTION 112: PROGRAMS AND CAMPUS EXPANSION

Section 112 is that portion of the 1961 amendments to the federal urban renewal laws which enables colleges and universities to assemble land for expansion, and to participate more fully than before in the renewal and redevelopment of blighted areas in their environs.

In August, 1962, twenty-eight schools had projects involving Section 112 credits in the project execution stage; twenty-four institutions had projects in the planning stage; and twenty-five others had filed statements of intention to begin preliminary planning.[1]

This chapter summarizes the important legislative actions that have made institutional participation possible. Section 112 projects at Drexel Institute of Technology (Philadelphia, Pennsylvania), the University of Oregon (Eugene, Oregon), and Temple University (Philadelphia, Pennsylvania) are illustrated in detail. Ten additional projects in execution stage are described in Table 18, Page 276.[2]

FEDERAL URBAN RENEWAL LEGISLATION

Urban renewal constructively channels the normal processes of city growth by coordinating public and private improvements in accordance with the community's long range development objectives. The key actions in any renewal effort are:

1. *Conservation* — the preservation of built up areas in good condition; the provision of better municipal services through code enforcement; and the encouragement of private groups to maintain their facilities.
2. *Rehabilitation* — the improvement of predominantly built up areas threatened by blight; through the demolition of selected sub-standard structures, repair and modernization of existing buildings, provision of public improvements and services to restore the area to a useful condition.
3. *Redevelopment* — the revision or replacement of existing land uses which are substandard or counter to the long-range redevelopment of the area. This action usually requires land clearance.

The educational goals of an institution are obviously served by any preservation and rehabilitation measures taken in its environs. Many colleges and universities have actively participated in cooperative efforts of this nature. It is only recently, however, that redevelopment has begun to play a special role in providing land and other advantages which allow the institution to expand beyond its existing boundaries under the provisions of federal legislation.

The incentives for redevelopment can be traced back to Title I of the Housing Act of 1949. Under this provision, enabling legislation in each state would permit local governments and their special authorities to use Federal loans and capital grants to acquire and clear slums and blighted areas in accordance with a local plan for renewal.

Federal loans and grants are intended to make up the difference between the cost of acquiring and clearing land, and the monies obtained for selling the land for a redeveloped use. Two kinds of cost are involved. Gross costs comprise the totals invested or spent in the redevelopment area: to plan and administer the redevelopment project; to acquire, clear, prepare, and dispose of the land for re-use; and to provide public services and public improvements necessary to support the proposed redevelopment. Net project costs are the difference between gross project cost and proceeds received from disposition of the land.

Net project costs are shared by the federal government and the municipality, generally with the government bearing two-thirds of the cost and the municipality expending one-third. However, a number of states provide grants and loans which are occasionally used to cover the local authority's one-third share. This sharing ratio may also be changed to three-quarters federal and one-quarter local under certain administrative conditions, or on the basis of population size.[3]

The local authorities' share may be in the form of any combination of credits for improvements in the redevelopment area, or as cash grants. Non-cash grants may be pooled

Table 18: Urban Renewal Plans

SCHOOL AND LOCATION	ENROLLMENT SIZE	TYPE OF SUPPORT	PROJECT SIZE	EXISTING CONDITIONS	REUSE	COMMENTARY
1. CONVERSE COLLEGE, SPARTANBURG, SOUTH CAROLINA	617	Private	12 acres	Residential	Institutional	Private acquisition by the college for which the city will receive Section 112 credits. As the college land falls within the city's urban renewal area, it is anticipated that the city and college may later be able to exchange parcels of land to their mutual advantage.
2. GEORGIA STATE COLLEGE, ATLANTA, GEORGIA	3,592	Public	18.3 acres	Sub-standard housing and mixed land uses	Institutional	College will purchase 4.07 acres of project land for its own use. City will receive Section 112 credits for previous improvements by the college in the renewal area. These earlier improvements to be credited against the city's share of the project costs.
3. ILLINOIS INSTITUTE OF TECHNOLOGY, CHICAGO, ILLINOIS	7,305	Private	47 acres	Dilapidated structures and mixed land uses	First stage project will be an industrial research park adjoining the campus.	Total land development will occur in stages. Project still in preliminary stage.
4. LINCOLN UNIVERSITY, JEFFERSON CITY, MISSOURI	1,427	Public	39 acres	Sub-standard housing and inadequate street patterns	9 acres will be purchased for institutional use, including land for completing a site for the University's laboratory school, land for new housing units for faculty and staff, and acquisition of a building and site for for cooperative or staff housing.	City will receive Section 112 credits.
5. LEHIGH UNIVERSITY, BETHLEHEM, PENNSYLVANIA	3,507	Private	4 acres	Sub-standard housing	Chemical-metallurgic laboratory and parking facilities.	Previous purchase by the University in renewal area reduced city's share of project costs to $15,000.
6. YALE UNIVERSITY, NEW HAVEN, CONNECTICUT	8,214	Private	257 acres	Sub-standard environmental conditions	Several parcels are made available for institutional use as one of several alternatives in the plan.	The University has already acquired ten acres for expansion of its educational facilities, including the three million dollar purchase of two outmoded public high schools. Section 112 credits may eventually exceed four million dollars.
7. RUTGERS— THE STATE UNIVERSITY CAMDEN CAMPUS, CAMDEN, NEW JERSEY	Not available	Public	13 acres	Mixed land uses and substandard environmental conditions	Campus expansion.	No city contribution necessary to renewal project: University's credits for properties already purchased in the area, and funds provided for new construction under the state college bond issue, will cover the local one-third participation.
8. UNIVERSITY OF MARYLAND BALTIMORE CAMPUS, BALTIMORE, MARYLAND	Not available	Public	97 acres	Sub-standard housing and environmental conditions	13.4 acres of the renewal area are being acquired by the University for use as sites for married student housing, instructional facilities, and parking.	Section 112 credits to the institution reduced the local participation by one-third.
9. UNIVERSITY OF SOUTH CAROLINA, COLUMBIA, SOUTH CAROLINA	6,840	Public	23 acres	Sub-standard housing and mixed land uses	Several existing commercial structures will be used for University maintenance department; remainder for department of physical education and intramural playing fields.	
10. UNIVERSITY OF TENNESSEE MEDICAL UNITS, MEMPHIS, TENNESSEE	Not available	Public	145 acres	Sub-standard housing and non-conforming structures	Sites for new facilities, expansion of existing facilities.	University's medical units share the site with other health agencies, hospitals and clinics. Re-use plan encourages development of additional uses such as housing and commercial buildings which can service the medical center.

the local authority, so that an excess over the required municipal participation in any one project may be credited to another project.

College and university expansion affords excellent opportunities for institutional participation in local renewal and redevelopment objectives. In recognition of this fact, Section 112 of the Housing Act of 1949, as amended by the Housing Acts of 1959 and 1961, provides the following help to colleges and universities:

1. Federal loans and capital grants can now be used for redevelopment of non-residential land for campus expansion. However, it must be in accordance with an urban renewal plan that provides a cohesive neighborhood environment compatible with the needs and functions of the educational institution.
2. Under certain provisions, the expenditures made by an educational institution in the urban renewal area are eligible to be counted as the local share of any renewal projects.[4]

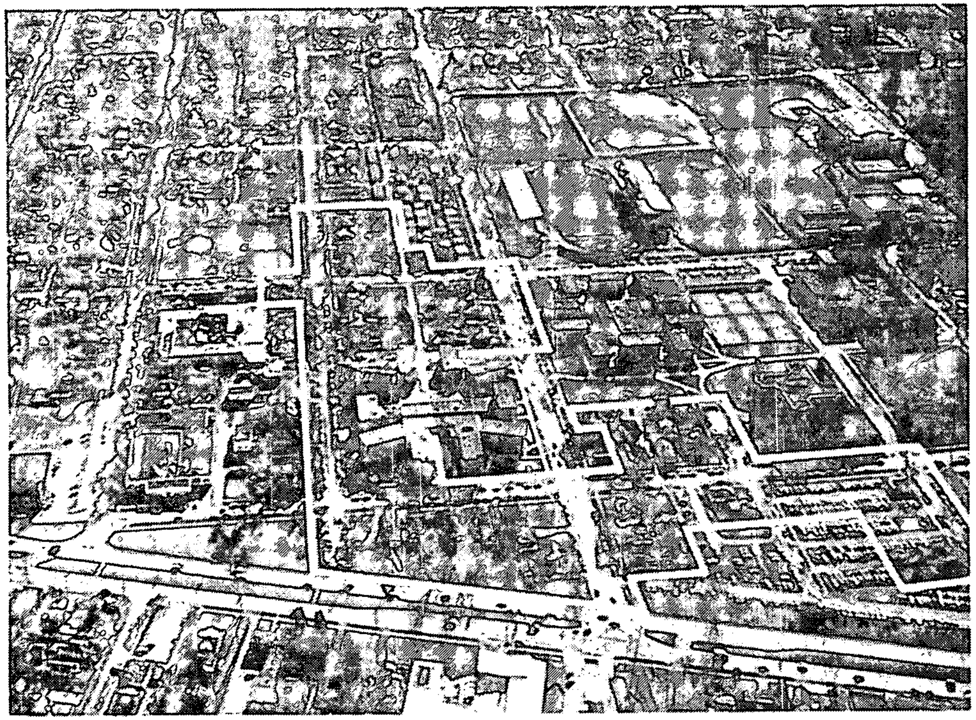
The ready acceptance of the federal urban renewal program as a method of meeting the institution's expansion requirements has been due to the pioneering work of several urban institutions located in cities where planning has been held in high regard. An excellent example of enlightened self-interest is the University of Chicago's leadership in one of the first complete urban renewal plans (1954) undertaken in the country—the 48-acre Hyde Park-Kenwood project, in a deteriorating residential neighborhood adjacent to the University. The project eventually included 591 acres, with an estimated net cost of thirty-six million dollars. Of the one hundred one acres to be cleared under the plan, thirty acres were to be re-used by public agencies, forty-nine for residential construction, eight acres for commercial use, and the remainder for institutional purposes, not connected with the University of Chicago. The University's gains in the project will be the satisfaction of having its environs restored to a compatible condition.[5]

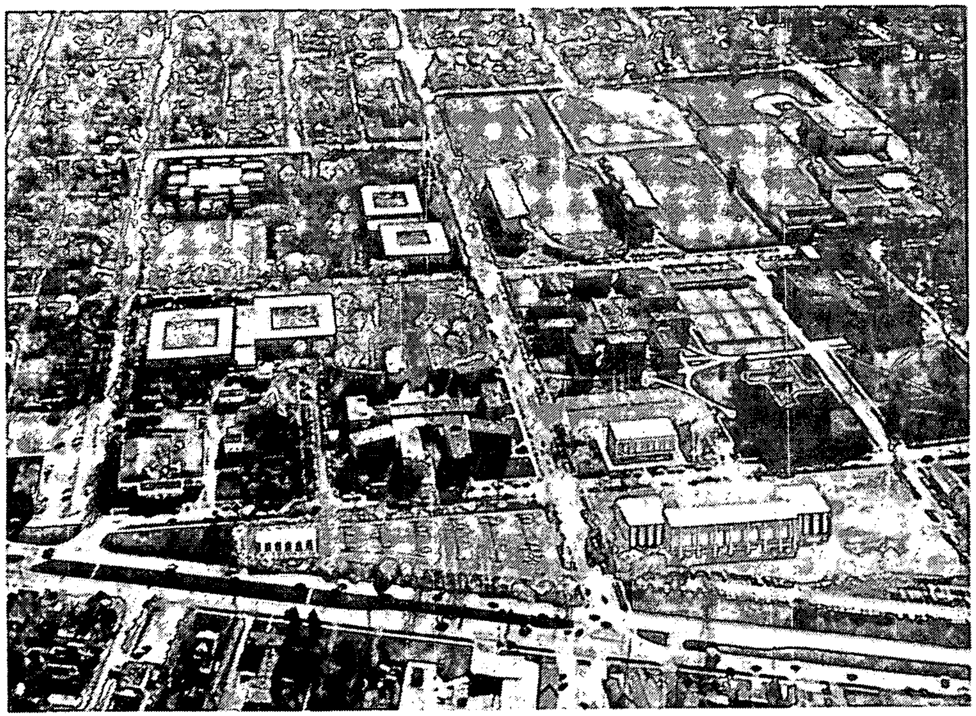
Another significant example of the results of pioneer institution-community planning is the University Circle development in Cleveland. In 1957, thirty-four institutions, sharing a 488-acre site, commissioned a long range plan for guiding their growth as a cultural center. A recent reappraisal of the plan (prepared by Adams, Howard, and Greeley) indicated "remarkable progress" towards fulfilling its objectives. The institutions have already acquired thirty per cent of the land needed for their eventual twenty year expansion, and their parking inventory has been increased by twenty-five per cent. Through cooperative efforts on the city's part and the non-profit foundation that coordinated the project, it is expected that two hundred fifty million dollars will be expended in public and private funds to develop the institutional area and its environs. Within the framework of the renewal project, Cleveland has tentatively committed five million dollars for the public improvements necessary to implement the plan.[6]

Institutional efforts in the Morningside Heights area of New York City and the more recent cooperative planning through the West Philadelphia Corporation are other signs of an increasing awareness by colleges and universities of the advantages afforded through participation in local renewal.

FOOTNOTES

1. Survey by the author.
2. Communication from Division of Program Planning, Urban Renewal Administration, Housing and Home Finance Agency, September 12, 1962.
3. Fitzpatrick, B. T.; "Assistance For Colleges And Universities Located In Or Near Urban Renewal Areas," Washington, D.C.; American Council on Education; 1961.
4. See: *Section 112 (a).* Title I, Housing Act of 1949 as amended by Housing Acts of 1959 and 1961.
5. Levi, Julian; "The Neighborhood Program Of The University Of Chicago," August, 1961.
6. "A Status Report On The Plan Of Development For University Circle"; Jack Meltzer Associates; undated.



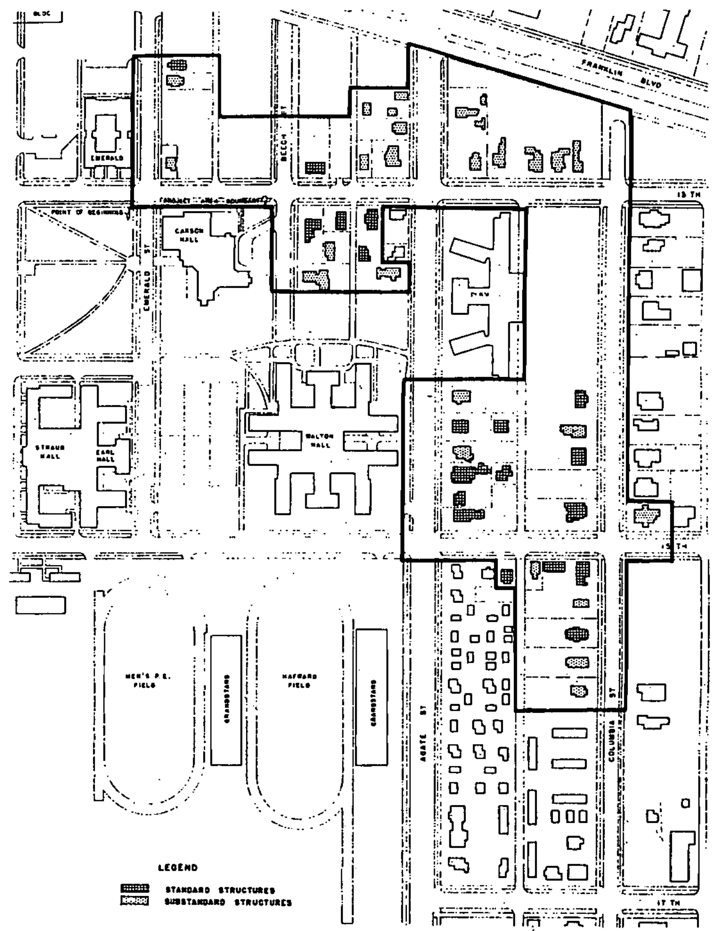


1B

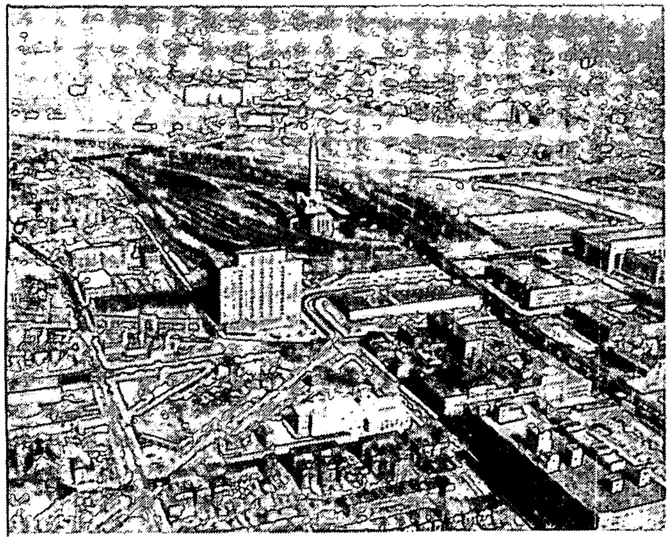
1A, B, C
East Campus Urban Renewal Project,
University of Oregon
Eugene, Oregon

The 17 acre project, shown in the air views and on the map, was justified on the basis that 27 out of 46 structures in the project area were classified as sub-standard housing, and that the acquisition of the 17 parcels not owned by the University of Oregon in the project area will promote proper development of the University and neighborhood. In 1962 construction of a University dormitory in the project area was completed (compare project map and air photo), while renewal approvals were being obtained in Washington. Proposed institutional re-uses include dormitory facilities for 2,100 students, a new administration building, a health center or graduate center, post-office and parking for 435 automobiles.

PHOTOS: EUGENE REDEVELOPMENT AUTHORITY



1C



2A

2A, B
Drexel Institute of Technology
Philadelphia, Pennsylvania
Co-educational
Private Support
Spring 1962 enrollment: 5,931

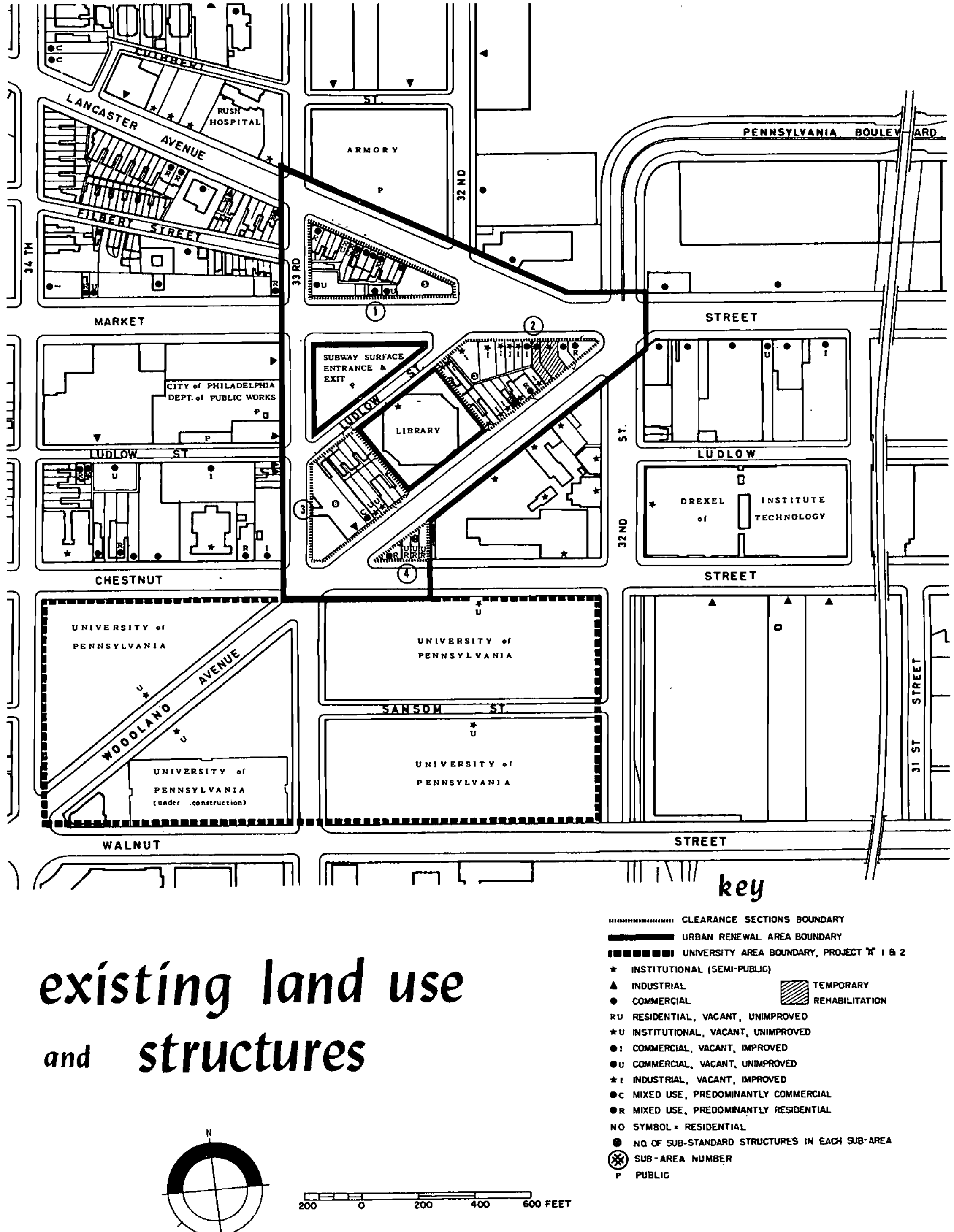
Like many institutions located in older sections of core cities, Drexel faces the problem of urban blight in its environs and impressive demands to expand its facilities. Rather than move to a new campus, the Institute decided to stay where it is and with the encouragement of the community participate with local planning and redevelopment agencies in renewing its environs.

As shown in the air view and survey map, the institution's environs were dilapidated, street patterns were obsolete, land was crowded, incompatible uses were spread throughout a neighborhood where extensive deterioration was evident.

However, the land-use position of the Institute was ideal, with mass transportation nearby and a number of sister institutions such as the University of Pennsylvania ready to join in the common cause of renewal through the West Philadelphia Corporation (see page 49).

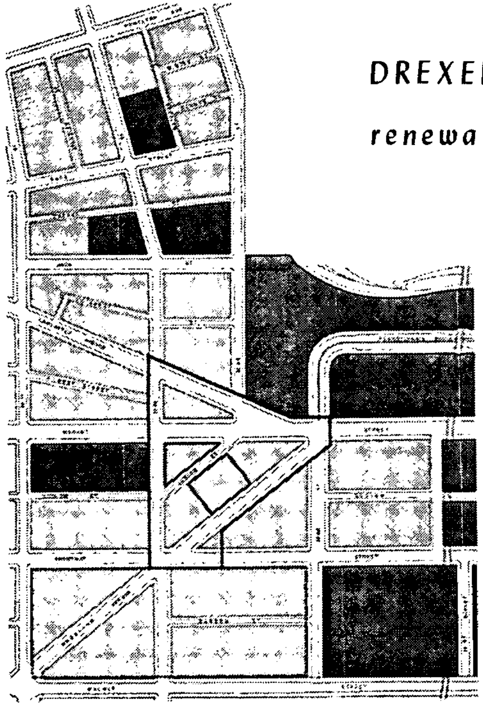
There are important technical steps required for staging acquisition clearance and assembling land for disposition. The splintered land uses, which make it difficult for private institutions to assemble land, are clearly evident in the scattered land-ownership patterns.

PHOTOGRAPHS AND DRAWINGS COURTESY
OF DREXEL INSTITUTE

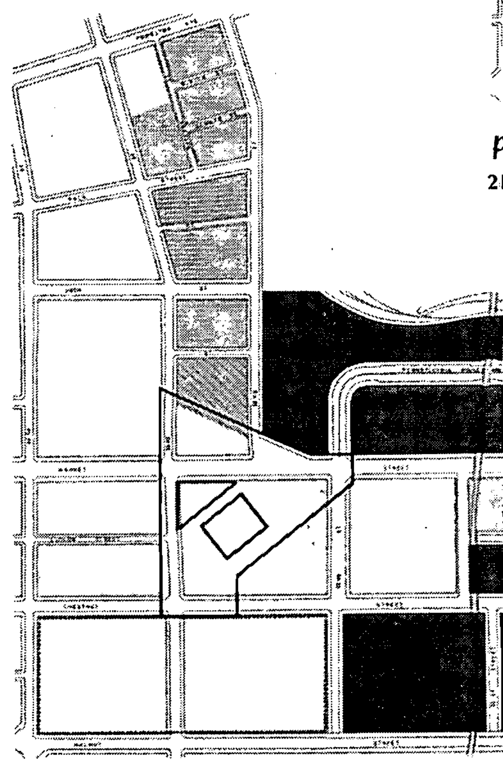


2B

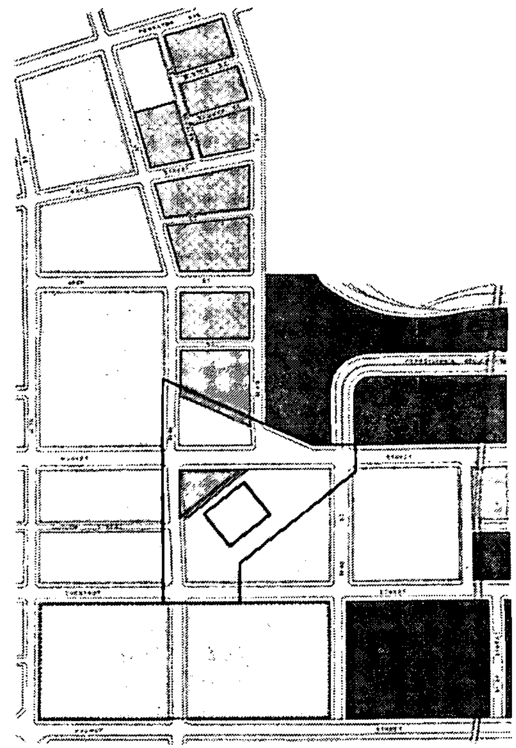
DREXEL urban renewal area



existing district zoning
2C



proposed district zoning
2D



proposed district plan
2E

2C
Existing district zoning, allowed primarily industrial and commercial uses.

2D
New zoning allowed selected industrial uses to continue in the environs of the project area, but most of the district was rezoned into a Residential "F" zone, which permitted institutional development.

2E
The proposed district plan, allows a coherent formation of an institutional neighborhood by joining the Drexel project and the contiguous renewal project sponsored by the University of Pennsylvania just south of Walnut Street.

2F, G, H
On the basis of the proposed district plan and renewal plan, parcels for disposition were identified. In 1962 Drexel acquired parcels 1, 2, 3, and 4 for approximately $1.95 per square foot. The local city council passed an ordinance vacating several local streets, allowing reasonable assemblage of land for the development of the new block now formed by 32nd and 33rd Streets, Walnut and Market Streets. (See schematic site plan for institutional re-uses.)

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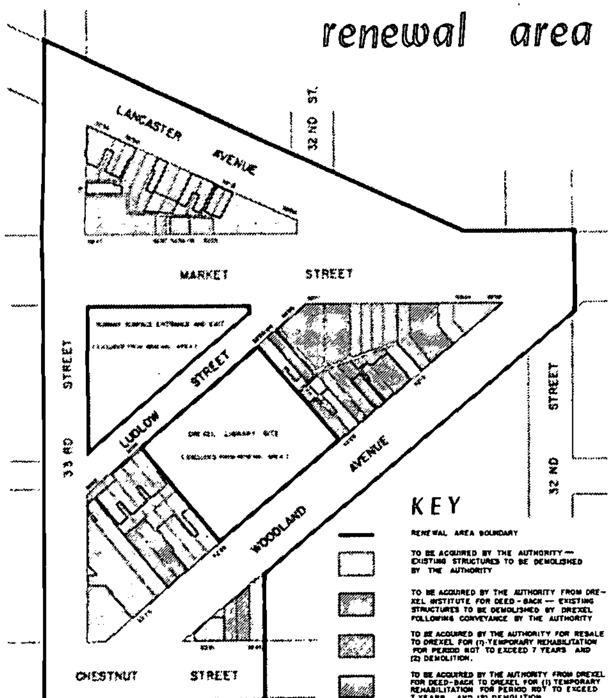
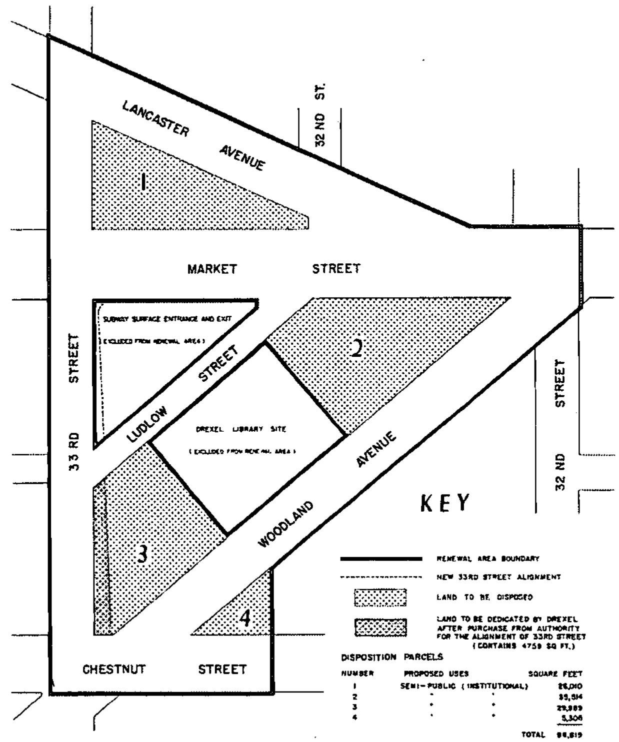
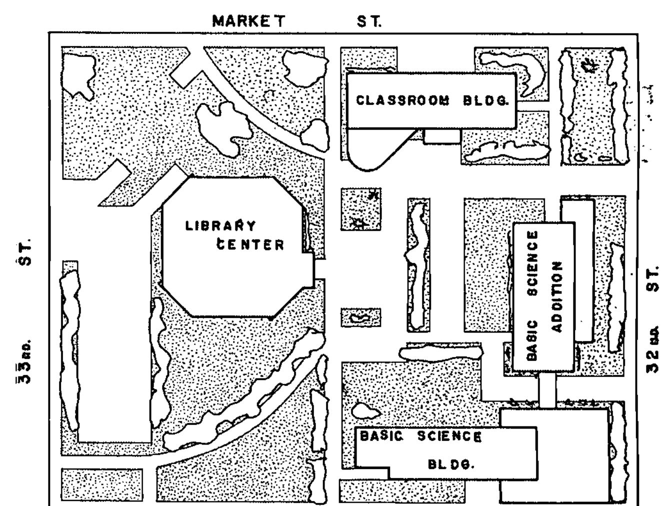
DREXEL urban renewal area



acquisition, clearance, and rehabilitation plan
2F



land disposition plan
2G



2H

3

Temple University (1961)
Philadelphia, Pennsylvania
Co-educational
Privately supported
Spring 1962 enrollment: 18,582
Plan started in 1955 and subsequently revised.

ALL PHOTOS AND DRAWINGS COURTESY OF:
NOLEN AND SWINBURNE, ACHITECTS AND PLANNERS,
PHILADELPHIA, PENNSYLVANIA

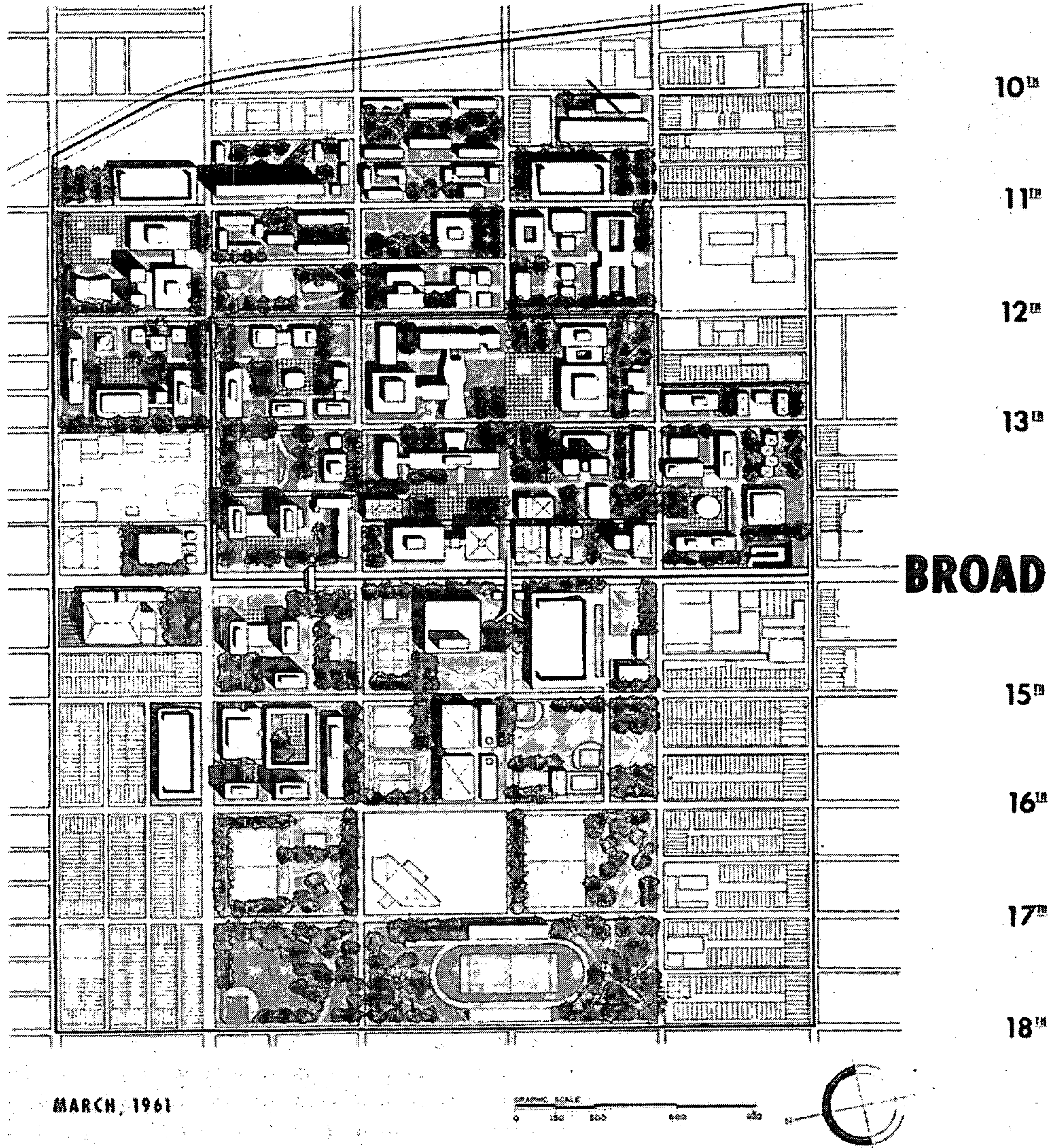
Temple University is located in the heart of the metropolitan area where long-range planning has had wide acceptance. In early 1955 the University began to measure its growth needs and found that its enrollment might quadruple in fifteen years. The campus was divided by a number of small streets, the immediate environs were blighted, the cost of land for acquisition ranged up to $400,000 per acre. The alternatives for expansion seemed few until the University and its consultant began comprehensive planning. Special institutional committees outlined the future academic prospects and the consultants matched the needs with an overall physical plan (see drawing) that integrated older buildings (shaded) with new facilities. With the cooperation of City officials local streets were vacated and selected areas cleared of slums. The former made possible a cohesive land use pattern; the latter was the first step in up-grading the institutional neighborhood.

Under the 1955 plan $5 million of construction has been built (see next pages). The success of the initial venture has encouraged the institution to expand its planning from 40 acres to 138 acres. (See air photo.) The 1961 plan, shown opposite this page, indicates in preliminary fashion the institution's growth needs to 1990. Playfields, dormitories, classrooms and educational facilities will grow in ring-like fashion from the nucleus that was the original plan. Broad Street, a major city thoroughfare will be bridged over. Special attention has been given to the landscape treatment, and an overall structure of great strength has been successfully established through careful site planning and manipulation of the sequence of open spaces.

3A
1961 Master Plan

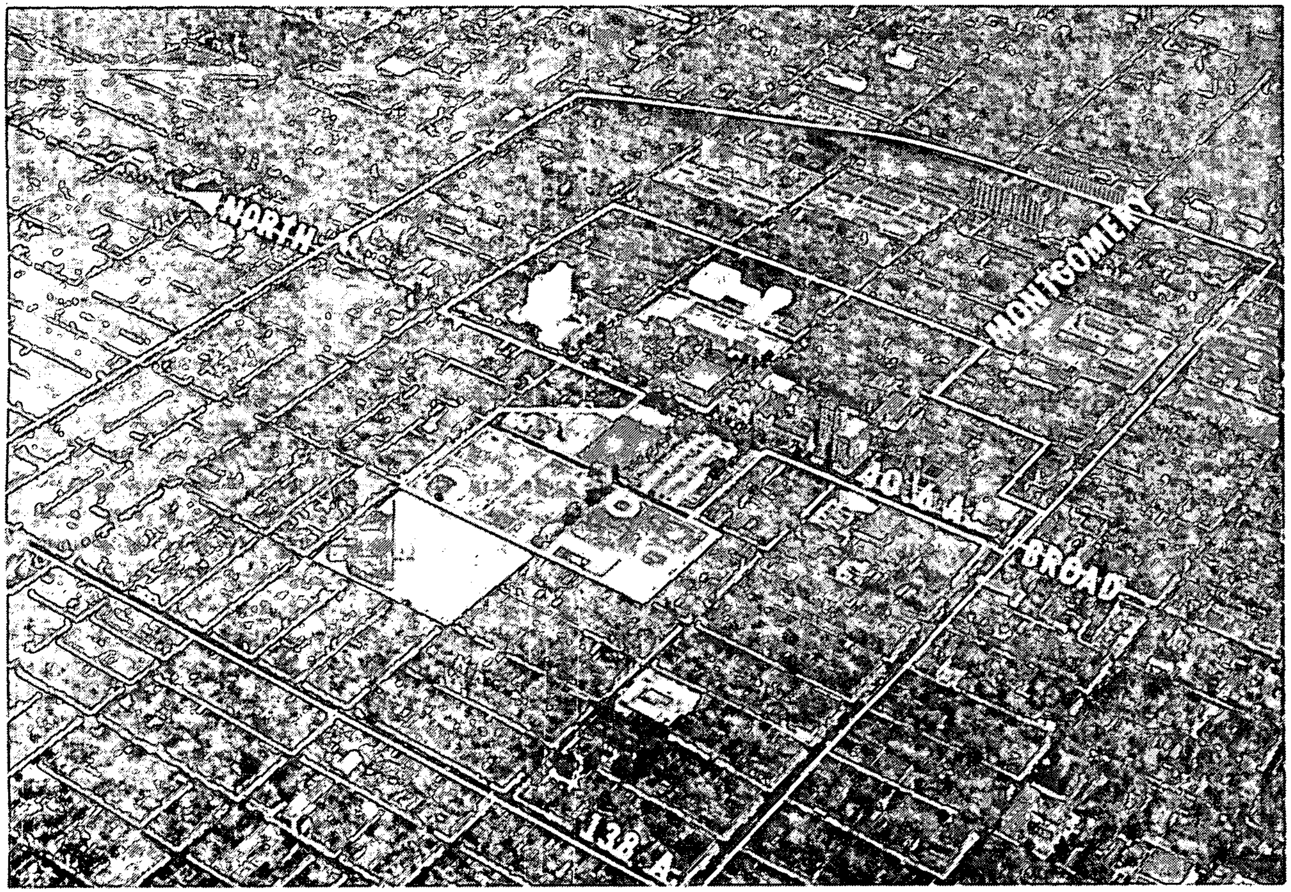
3B
Air view of university area showing boundaries of planning. Barton Hall is shown completed. Chemistry building and completed men's dormitory are superimposed.

3C
1955 Master Plan



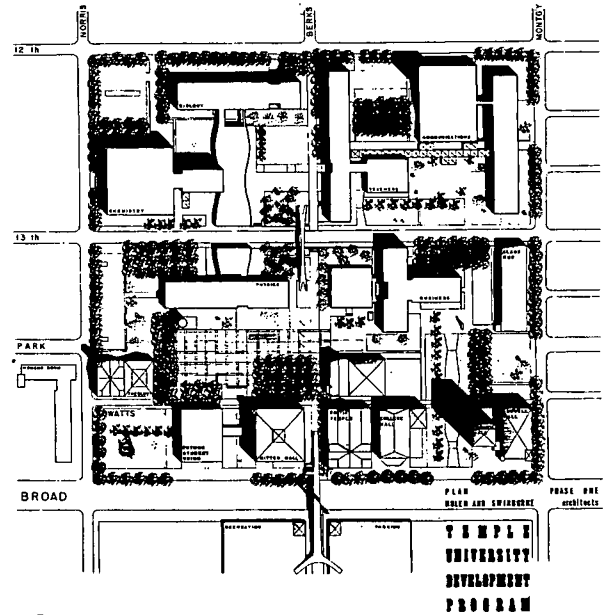
3A

289



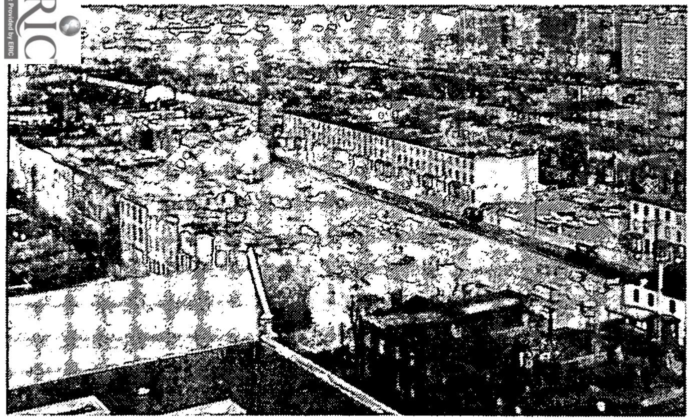
NORTH
MONTGOMERY
BROAD

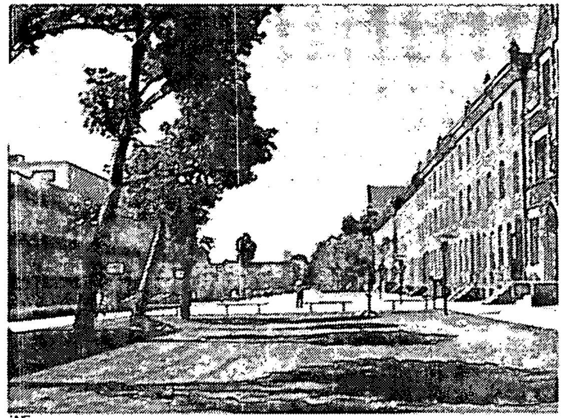
3B

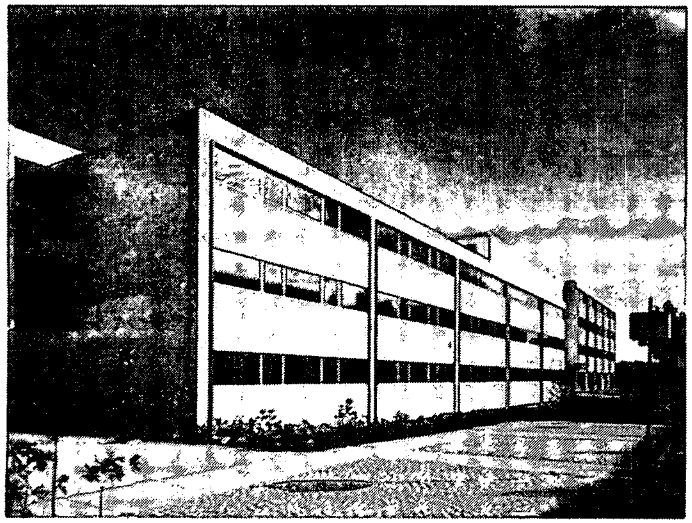


NORRIS
BERKS
MONTGY
12 th
13 th
PARK
WATTS
BROAD
PLAN
NOLEN AND SWINBURNE
PHASE ONE
architects
TEMPLE
UNIVERSITY
DEVELOPMENT
PROGRAM

3C


3D


3E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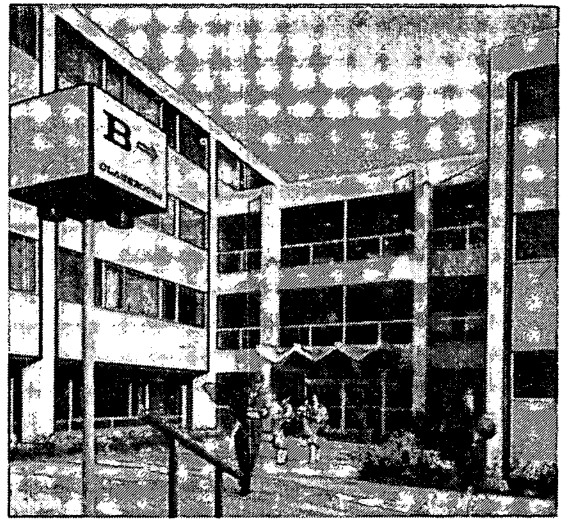


3G

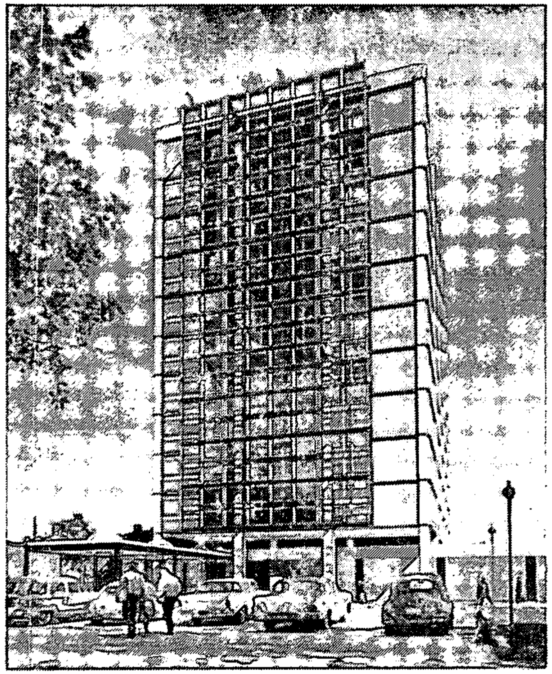
3D, E
Air view of razing of site in preparation for construction of Barton Hall. Street running through site was vacated and made into a pedestrian mall. Row houses will eventually be demolished to create a Great Court extending to Broad Street.

3F
Barton Hall (Physics and Biology)
Square footage: 154,000
Cost: $3,628,000
Architects: Nolen and Swinburne (1960)
General view of laboratory wing and faculty research unit at extreme end.
PHOTOS BY: C. V. D. HUBBARD

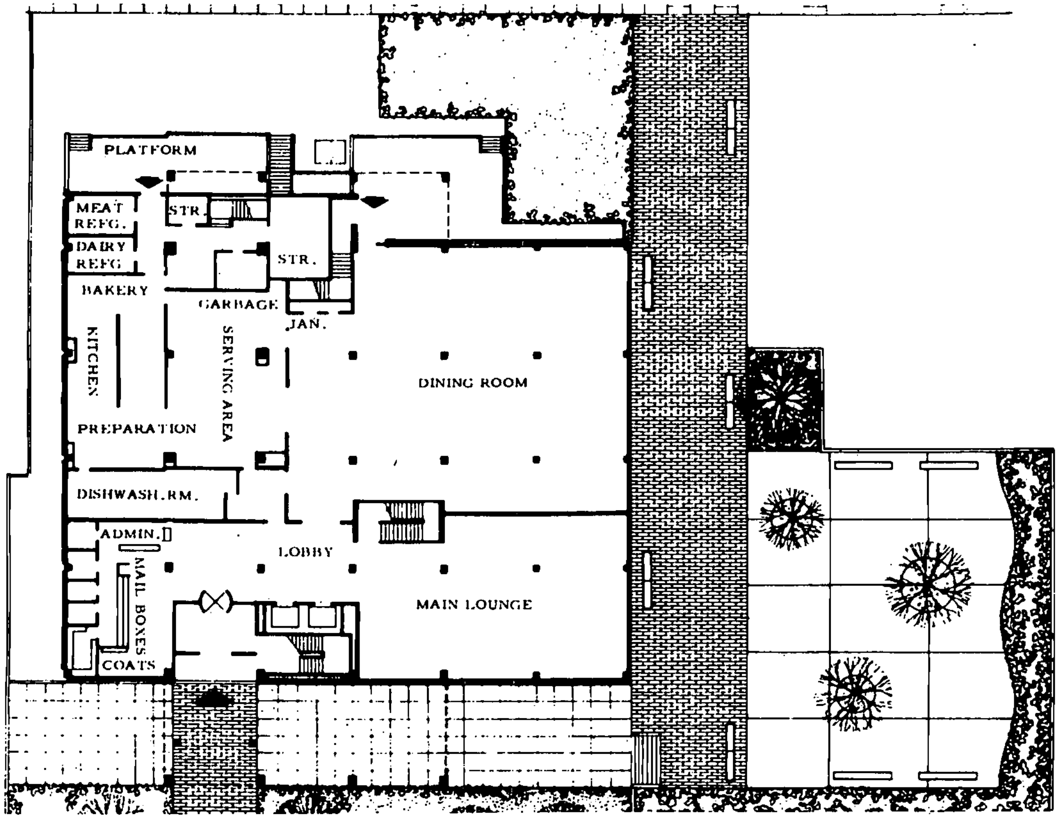
3G
View of main entrance
3H
First stage housing
Decisions on housing were affected by factors of land cost, zoning, the relationship of the housing area to the neighborhood and academic sectors of the University, the cost of housing to the student and institution, the desire to keep reasonable limits on the concentration of students in any one area. As part of the master plan studies, a 1,500 student residential area was designed for a two block area close to the first stage academic construction. As shown in the model, the first phase construction would consist of two eleven-story high rise men's dormitory sited near an existing 300 women's dormitory (shown as white blocks in model).


3H

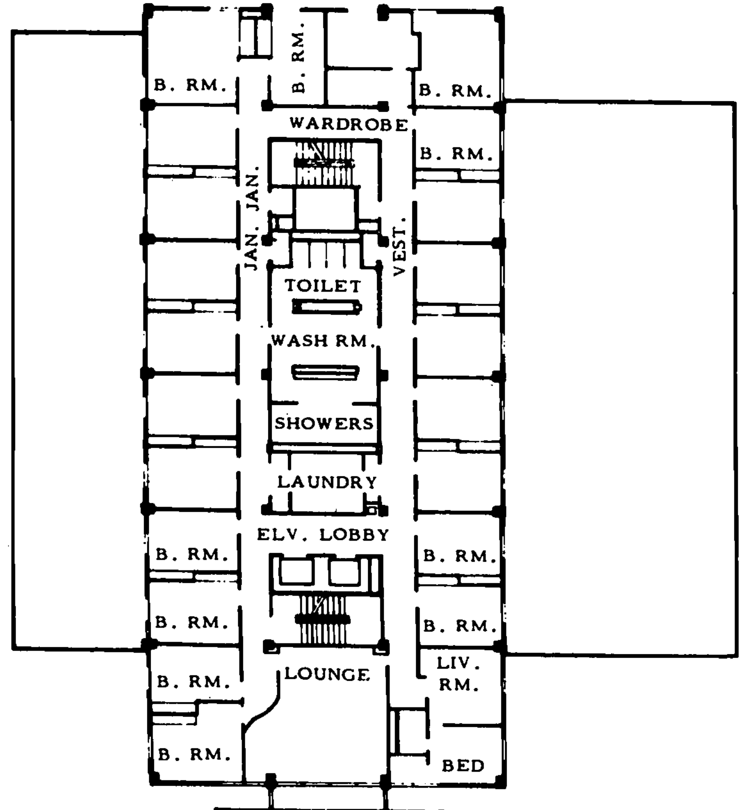
290



3I



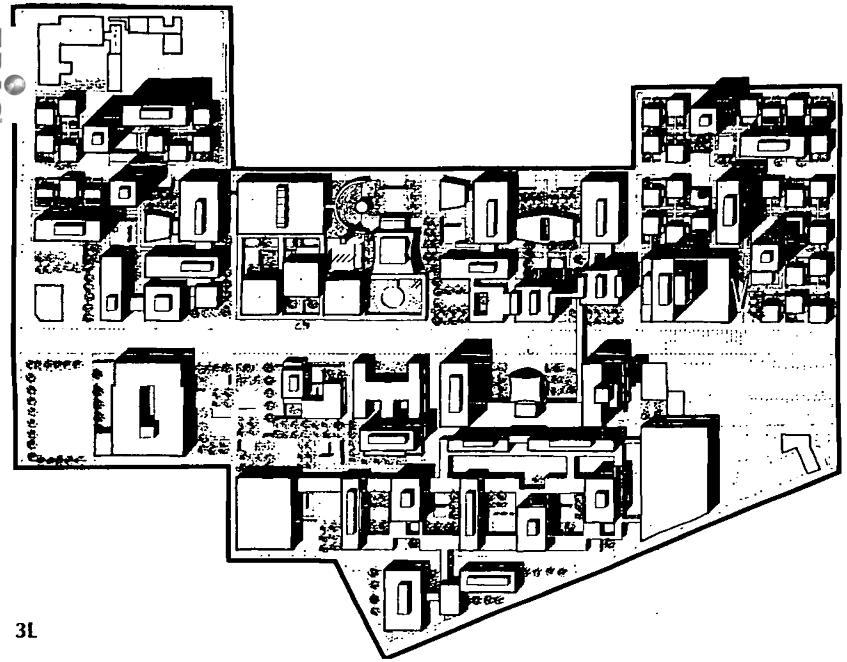
3J



3K

3 I, J, K
Johnson Hall (1960), Temple University
Philadelphia, Pennsylvania
Nolen & Swinburne, Architects

The first stage high rise building, shown in elevation and floor plans, consisted of ten dormitory floors – single loaded corridors facing core facilities. The 45 man groups per proctor per floor were linked together by a 2 story lounge every other floor, thus creating a 90 person social group. The ground level area contained dining, kitchen, lounges, and administrative control rooms. Service was provided from the rear of the building.



3L

Center for Health Sciences, Temple University (1962)

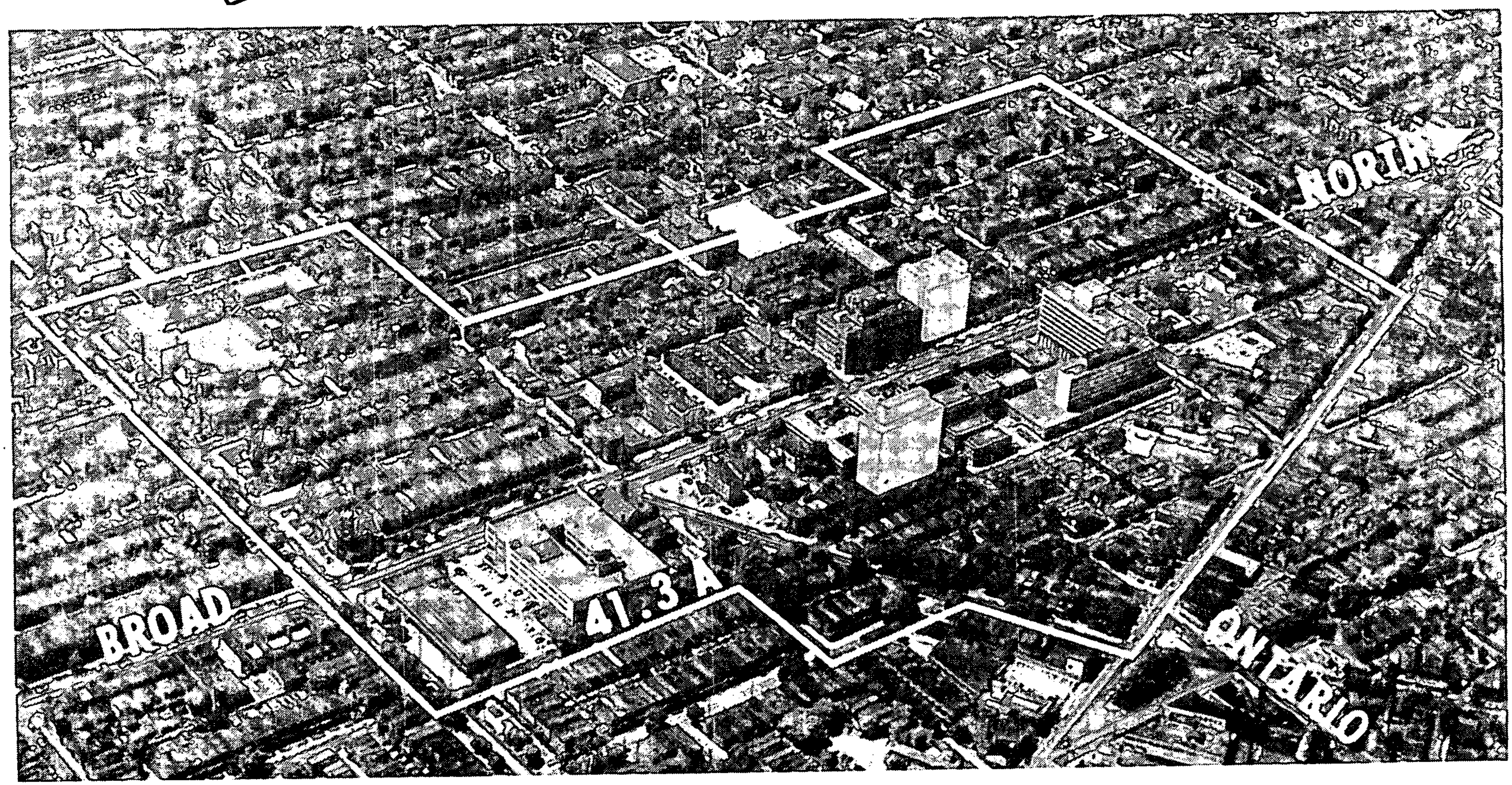
North of the Academic Center the University maintains a medical school and conducts research and teaching in the health sciences. For the 41 acre plot Nolen and Swinburne have applied the campus development principles found successful in the earlier planning.

3L

The preliminary site development, envisions a complex of residential, educational, hospital and research facilities on both sides of Broad Street.

3M

Existing buildings and the first stage construction can be seen in the air photo to the right.



3M

8. New Campuses

"The first two factors created an environment which was inefficient, difficult and expensive to operate, and often unpleasant but, by themselves, these factors did not necessarily dictate relocation . . . In every case . . . the high cost of surrounding land made its acquisition economically impractical."
(NEW CAMPUSES FOR OLD—
A CASE STUDY OF FOUR CAMPUSES THAT MOVED)

HOW MANY?

The surge in higher education enrollments has been accommodated by expanding older campuses and developing new institutions. In 1962 at least fifty new campuses reached the planning or construction stage. The tempo is unusual but the phenomenon is not special to our age. On the average, the United States has built a new campus a month since the Declaration of Independence.

These great enterprises, and sometimes modest undertakings, have been prompted by the desire to experiment, to support a religion, or to serve a region. In the 19th century neither fear of Indian attacks, lack of proper secondary schools, severity of climate, nor general poverty prevented dedicated people from advancing the cause of higher education. While some of the earlier reasons for starting new campuses still hold true, the impetus for 20th century growth is largely population increase and the requirements of a technological society, as described in the first chapter of this book.

A few new campuses are also being built because older institutions want to move to a better site. This kind of transition too can be observed as part of the historical pattern of American higher education. Trinity College (Connecticut) vacated its original site to make way for the State Capitol; Western Kentucky College moved from bottom lands to hilltop, Columbia University, from downtown to uptown—all these prior to the age of the automobile, and all because of a need to accommodate expansion.

The incentives to move in recent years have been chiefly urban blight in the environs of the institution and the operational problems that arise when institutional land holdings are not contiguous, but broken up by streets and parcels not held by the schools. However, the critical factor in *the decision to move* (as reported by the Educational Facilities Laboratories, Inc., and quoted to the right) has been the institution's inability to acquire additional land at reasonable prices. Considering the institution's potential role as a cultural and economic resource in the community in which it is located, and its usefulness as a force and theme in improving the urban environment, then the extension and application of urban renewal techniques might profitably be re-examined so as to utilize more fully the institution as a "generator of urban form."

Another small group of new campuses represents satellites of existing schools. Satellites are started rather than a new college or university because the mother campus can supply the capital and administrative talents necessary to operate the institution. In addition the satellite can share the academic status and prestige of the sponsoring unit. Some private and public schools use the satellites as feeders and filters for the main campus. Occasionally this is done because the geographic area in which the satellite is located is too small to support a complete campus. Also, this system enables the central campus to concentrate on upper division and graduate studies. Drop-out rates are highest in the first two years. Those students successfully completing junior division courses can move on to the main campus, which is freed in part of the influx of the junior division students. Sometimes satellite campuses are established because the sponsoring institution wants to stake out territorial rights in a growing population area.

How many new campuses will be constructed in the next decade because of these reasons is a matter of speculation. Educational purpose is one factor to be considered; size, another. In guessing what may happen I would divide the prospects into three parts: university growth, college growth, and junior or community college growth.

In estimating the number of new university campuses, I share the view of those who believe that 25,000 students is the maximum desirable optimum enrollment for a university on a single campus. Beyond that figure the vis-a-vis relationships between members of the academic community become attenuated. Higher density facilities are needed to maintain the necessary com-

pactness of central campus. The cost of high density facilities, the provision of common services, library requirements, equipment needs, and administrative liaison are such that a new campus may be cheaper to construct than the operation and expansion of one larger than 25,000.

As 1962 statistical bases are available, a general indication of growth needs for the university segment of higher education can be guessed. Of the 143 universities in the United States 82 have less than 10,000 students. Eventual growth of all universities to an optimum size (25,000) could easily accommodate the anticipated total enrollment of 3 million university students by 1970. This statement assumes that the university's share of total enrollments in higher education may rise from forty per cent (1962) to fifty per cent.

Gathering of faculty and the establishment of academic traditions are never easy matters. With the production of scholars lagging (relatively) behind enrollment growths, it will be difficult to organize viable new universities. In addition inter-institutional jealousies and state politics must be overcome for new public institutions to be launched. A sizeable private philanthropy has to be gathered to start a private school. For these reasons too the expansion of existing universities is more likely to occur than the start of new ones.

Exceptions to this general rule may occur in those states which will have an increasing percentage of the national population — especially those states where present state universities are near maximum size — and in some metropolitan cities which do not yet have a public university. California, New York, Minnesota, Florida and Wisconsin have already launched long-range plans for new University campuses — about a dozen in all in the next ten years. My guess is that at least eleven additional public universities will be planned for these metropolitan areas: Atlanta, Georgia; Dallas, Texas; Denver, Colorado; Cleveland, Ohio; Houston, Texas; Indianapolis, Indiana; New York City; Philadelphia, Pennsylvania; Phoenix, Arizona; Boston, Mass. and Washington, D.C.

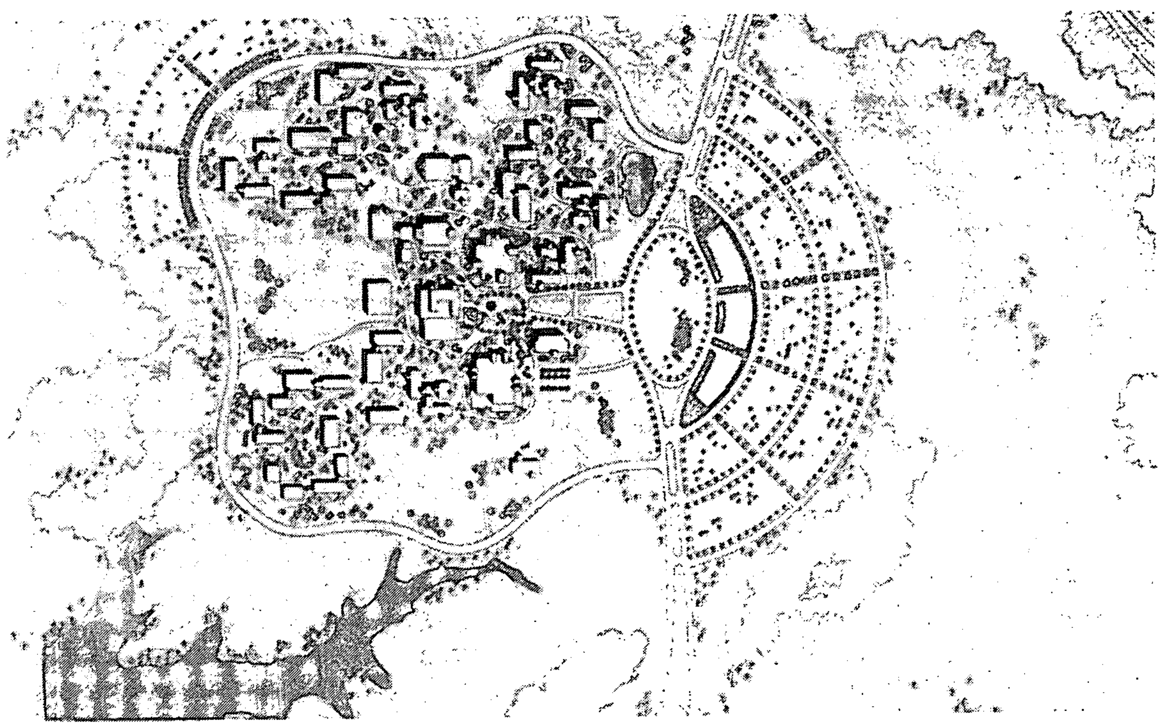
How many new campuses will come into existence to satisfy the other 3 million students (perhaps 4 million non-university students by 1970) is more hazardous a speculation than predicting university growth. Larger federal appropriations for loans and grants for higher education may enable existing institutions to absorb a larger percentage of the increase than they have in the past, especially if the federal construction programs can be extended to include teaching facilities. The upgrading of teachers' colleges into four year liberal arts institutions will postpone some of the need for new campuses. Again, as for universities, states with large population growth, however, will require new colleges. The community college movement is still far from peaking. Many of the latter do not have permanent facilities of their own, and the possibility of 250 to 300 new community college campuses can be realized if funds can be secured for that purpose. While the number cannot be quantified, there are enough signs to suggest that present activity in new campus construction will not diminish, and in fact, will probably increase.

1
Southern Illinois University (1962)
Edwardsville, Illinois
Architects: Hellmuth, Obata and Kassabaum
Landscape Architects: Sasaki, Walker & Associates, Inc.

The emerging form of the 20th century commuter campus is well illustrated in this sketch plan for the final stage development of a 20,000 student public university. The central campus is completely pedestrian oriented, surrounded by a major loop road, outside of which lies the large multi-thousand parking lot, which in turn is surrounded by acres of playfields and open space.

The design of circulation is critical in such a scheme. Super-highway sized roads are needed to handle the volumes of traffic that enter and are discharged during peak hour flow. The core of the campus is penetrated in one direction by a service and circulation loop that brings visitors and special officers to the heart of the campus as well as allowing for a graceful pedestrian-scaled transition from parking lots to campus buildings. Well-developed landscape is mandatory in order to assure minimum amenity and safety. Design standards for parking must be figured at 100 cars per acre.

PHOTO: COURTESY THE ARCHITECTS.



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ANNING THE NEW CAMPUS

e following constitutes the steps to be taken in preparing plans for a new campus. The items in many ways parallel those covered in the descriptions of how to prepare development plans. The sequence is slightly different, for the selection of a site becomes a major consideration.

1. Preliminary programming
2. Preparation of a diagrammatic development plan
3. Site selection
4. Final development plans
5. Phase one project plans

Preliminary Program for Development

The first assessment that has to be made concerns the institution's general educational objectives. Obviously a two-year junior college will differ from a multi-departmental university, so the preliminary program must take into account not just educational philosophy, but must also translate that philosophy into preliminary data which can be used as a point of departure for estimating (a) physical plant requirements, (b) the criteria for selecting sites, and (c) the approximate costs of development and operation of the educational institution. Where older institutions are involved in moving to new sites, phasing of operations and moving costs must be included in the calculations.

The preliminary program should include a projection of curriculum by stages of development, along with population projections covering students, faculty, staff, and other personnel that may study, work, or be housed on campus.

On the basis of head count the nine areas of physical plant requirements should be reviewed and standards of development set for each category. The categories are:

Instructional facilities
Libraries and Museums
Research facilities
Centers of extra-curricular life
Institutional services
Housing
Sports, recreation and physical education
Parking and circulation
Utility systems

The size of site is related to campus population and curriculum; with parking, playfields, and research requirements being the next variables. The standards for planning modules for facilities, as suggested in Section II, can be used where local criteria cannot be prepared. By multiplying planning standards by head count and dividing total building requirements by desired F.A.R. and ground coverage ratios the acreage for building sites can be estimated. Parking and playfield requirements should then be calculated. The total would represent the minimum site size. To this figure an increment for expansion should be added. To help judge various sites, these acreage requirements could be translated into a land-use diagram.

The translation of planning modules into acres, and acres into total site requirements, however, cannot be done entirely by arithmetical expressions. One and one makes two, but shifts in circumstances are important to note before applying any rule of thumb. Thus, what seem reasonable and adequate criteria for selecting sites in a relatively rural or low density area may be entirely impractical in an urban setting. An optimum land-use diagram is useful in indicating the size of the enterprise as well as serving as a criterion for searching out a suitable site.

Site Selection

"He that builds a fair house upon an ill seat, commiteth himself to prison" (Francis Bacon). Normally several sites will present themselves for comparison and selection. The usual method of evaluation is to judge each site on the basis of criteria established during the preliminary programming. Criteria usually cover size and condition, setting, accessibility, and cost.

Size and condition. New universities in California are acquiring up to 1000 acres for each 25,000 students. New state colleges with ten thousand students each average about 250 acres. For a campus up to 5,000 students (with half the students in residence) allow a minimum of 150 acres. As a rule, purchases in excess of these figures should be encouraged to insure future extension and expandability, and the most inexpensive kind of amenity — landscape and open space.

The selected site should be in one piece and unencumbered by existing or potential easements or public rights of way. Generally a rectangular shaped site is preferred over irregular or long sites. This pemits maximum development of the interchange zone, and gives optimum accessibility from the periphery to the center of the campus.

Sub-soil conditions should be examined to insure relative freedom from rock, quicksand, and sub-surface water. Soil conditions should provide good drainage and be suitable for plant growth.

Sites with steep slopes and irregular topography should be carefully examined in terms of the land-use diagram. Not all land need be flat, for some surface configurations can be used aesthetically. In general, the central campus area should be relatively flat so as to avoid expensive bridging, difficult grades and other impediments to pedestrian travel.

There should be relative freedom from sources of noise external to the campus operations. Sites near heavily used highways and airports should be avoided, for safety as well as environmental reasons.

Campuses have been and will continue to be located in all sections of our national climate—from Alaska to the bayous of Louisiana. Each section will impose special climatic conditions which the architect and site planner must solve. Within each of the areas, however, sites can also be judged on the basis of micro-climate, thus avoiding the extremes of cold, excessive winds, smog and fog.

Setting. Setting here means the nature of the environs. As a land use the campus should be located in an area which is in keeping with the educational objectives of the institution. The availability of housing, commercial centers, schools and churches for those living off campus is an important consideration. Obviously, remoteness from in-

dustrial areas or other uses which create nuisances is a necessary goal. But compatability is also a two-way responsibility, and the community's point of view must be considered in making site decisions. Campuses which are likely to attract large volumes of traffic, build at high densities, or encourage industrial-like research activities should not be located in areas of the community where such activities may destroy or disrupt existing land uses (as they might in a low density residential area). The campus site development should conform with the community's long-range development plan and meet local fire, building and zoning standards.

Setting also reflects the availability of utility services, police and fire protection, and the supply of adequate medical and dental personnel for campuses that do not have their own infirmaries and health facilities.

Not the least important consideration is the availability of off-campus cultural resources, such as other institutions of higher learning, research institutes, museums, theatre and recreation activities. Part time employment opportunities for students are a factor for some schools. Few campuses can be self-sustaining in all these areas. The richer the context, the more vital the school. Proximity to a first-rate community orchestra may be worth several acres of open-space.

Accessibility. Accessibility has to be measured in two ways. The first considerations relate to the suitability and availability of various modes of transportation for bringing students, faculty and others to campus. For public institutions, centrality in the zone of future or existing population is a prime requirement. There are good techniques for estimating the limits of the service area of a public institution, which include forecasting land-use development, population growth and highway and transportation construction.

Private institutions, such as schools serving a particular religious faith, may determine centrality by spot maps showing where families live or church groups exist. This study would probably cover a wider region than a similar attempt to forecast the number of potential public institution students, and accordingly would be less precise, though nonetheless useful.

The second set of considerations as to accessibility concerns local traffic and circulation conditions, including such matters as the adequacy of existing roads for various types of flow — busses and service vehicles, automobiles and occasionally bicycles. Conflict between flows should be avoided. Road design should be evaluated in terms of grades, traffic hazards, poor intersections. The attractiveness of the approaches to the site should be examined. Such matters as timing of peak local traffic need attention so that traffic volumes destined for and originating at the school are not impeded by, nor add to, local congestion. Pedestrian links from campus to environs are of equal importance, especially when the locality provides services, goods and housing for the institution.

Cost. The cost of land consists of three items: first, land as a commodity; secondly, the costs of acquisition; and thirdly, the cost of preparing the land for development. Institutions have paid from $250,000.00 an acre to $500.00 an acre in recent years. Competion, availability, and location are the major differentials in the price of land. Professional appraisals are necessary in determining a fair price of any proposed acquisition. An independent and outside judgment is desirable.

Costs of acquisition will vary depending on the timing involved. The closer the site is to a metropolitan city the more difficult it is to assemble large parcels. The knowledge that an institution is making purchases sometimes inflates land values. Straws can be used in acquiring options. All the necessary land should be acquired (or optioned) at one time, so that holdouts do not circumvent the best use of the land or hinder development.

The cost of site preparation may be equal to the cost of the land as a commodity. Generally the criteria as to size and condition will eliminate those parcels which impose special costs in the way of grading, excavation, and drainage. Other things to be considered in estimating land preparation are the razing and removal of existing structures, expenses for utility connections, the addition of special roads and pavements to link the campus and environs. The site diagram will be useful in determining the magnitude of the required adjustments.

Relative to the total anticipated development, the costs of land are less important as criteria in site selection than accessibility, setting, size and condition of land. In evaluating a site, preferences will emerge if each category of criteria is first examined and applied to the several choices independently, and then all four categories examined together. In many ways the rating of sites is a subjective interpretation and numerical scores are awkward to use. For that reason a five grade system might be used instead. Thus each site rated as to whether it is "excellent," "good," "adequate," "poor," or "unsatisfactory" with reference to criteria established in the preliminary programming and site diagram stage.

As many sites as possible should be subjected to brief initial scrutiny. Having eliminated the least promising the remainder should be evaluated in greater detail. The final choice should be thoroughly examined in terms of engineering feasibility before a final decision has been made.

Final Development Plan

The site having been selected, the next step is to adjust the diagramatic plan to the actual site conditions. First this should be a land-use arrangement, then the general locations of facilities, and finally the supporting services such as utilities, and circulation. In practice a decision on one of these items will affect the others, but the above listing represents the priority of considerations. The purpose of the final development plan is to establish the overall design structure, establish planning and design controls to guide future development, and to identify the first phase projects.

Structure was described in Section III as

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establishment of hierarchical relationships between land uses, circulation and special site elements so that internal unity could be achieved in each sector and at the same time the campus would have a high degree of external identification as a design form. Because flexibility and expansion must be provided for in the long range plans, suitable provisions must be made for change. This can be accomplished through planning controls and design policies — for example:

a. *Programming*. Programs identify which uses are likely to be stable and which are likely to change. By sorting out uses that don't belong in the central campus because of their incompatibility, infrequent use, or expendability, room can be reserved for expansion.

b. *Flexibility in Design*. There are several kinds of design flexibility. Architecturally, buildings can be designed so that interior spaces can be easily rearranged. Movable interior partitions with good noise reducing qualities make it possible to vary the sizes of classrooms, seminar rooms, and offices. Flexibility here is not so much a matter of overnight transformation which can be costly, but a reasonable allowance for inexpensive modifications in the interior layout once or twice a decade.

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Flexibility may be obtained by designing low building units with foundations and columns sufficient to allow vertical expansion at a later date. Expansion may also take place by providing in advance structural systems and corridor and stairwell designs that allow wings and connections to be easily added if needed. Planned displacement is another technique for assuring flexibility. Buffer strips between buildings may give way later to actual buildings. Through removing generous lawns and tree plantings, the succeeding design need not be less effective. A more urbanized landscape — courtyards, fountains, benches, special pavings — may replace the park-like setting. One kind of beauty is replaced by another. Alignments for future roads can also be reserved well in advance of need. Tree planting along paths, for example, can be kept back from the right of way in anticipation that existing paths will be widened at some future date.

c. *Other Controls*. By establishing design controls in the plan, overbuilding, underbuilding, and encroachment on reserve areas can be minimized. The simplest design control is a land-use designation. Another is the set back line which ensures that a building is separated from the open space upon which it sits. Buildings don't have to front on the line, but cannot go beyond the set back line.

Building lines are more positive commitments, since they establish the line where the first floor or plaza level floor of the building must be constructed. Building lines help assure the creation of proper-sized pedestrian malls, plazas, sidewalks, and other spaces adjacent to the building. Local building and zoning ordinances may be used in establishing set back and building lines, or the lines can be set in place after the development plan has been completed.

Height regulations also control density of development. Programming information will identify activities susceptible to vertical organization. Use areas having the potential of vertical organization can be so designated on the design plan by indicating the height limits. Floor Area Ratio (FAR) is another useful control on density and intensity of use. FAR is the ratio of total floor area to the total ground area in a given planning area. Thus an FAR of .50 means that the total floor area cannot exceed one half of the ground area related to the building. A GAC is often used in conjunction with the FAR. GAC (Ground Area Coverage) sets the maximum area in which a building can cover a site. Thus, GAC .75 means that at least 25 per cent of the site must be open.

The selection of building materials or colors of materials, as well as establishing a selection of tree types for major roads and walks, can be helpful in obtaining design unity.

Because the final plan is a summary of program instructions and design feasibility, design controls should not be imposed until full study of alternative solutions has been made during the preliminary planning. Height restrictions, FAR, and GAC ratios are intended to give as much flexibility to project design as possible, and at the same time control development to meet long-range planning criteria. Indices of these kinds cannot be arbitrarily established by inspecting other campuses and hoping that comparable design effects—such as the quality of open space — can be obtained by applying a statistical formula. Since density formulas must also reflect special local requirements for supporting facilities such as roads, parking, utilities and pedestrian paths, a single overall formula is not as effective as breaking down the total campus into use areas (districts), examining the requirements for expansion and flexibility in each area, and then establishing individual district controls such as a FAR.

d. *Continuity in Planning*. By carrying on planning as a continuous activity, it is possible to identify changes well in advance of project execution. If for no other reason than to reduce the number of snap judgments and premature decisions on capital improvements, contining planning is beneficial. However, real advantages lie in the usefulness planning has as an instrument for change. Continuing planning may take the form of a five-year capital outlay budget. Project plans are identified five years in advance of execution. This allows an orderly and systematic schedule of improvements. New construction can be arranged so that when buildings are opened, roads, paths, utilities and other site elements are also ready. Not all needs can be predicted in time for an orderly review, but emergency demands and special situations become smaller problems when the overall framework is well established. Changes in the assumptions that were basic in the development plan can be incorporated, and the overall design plan adjusted accordingly.

Phase 1 Projects

Without knowing the circumstances it is difficult to state what particular facility should come first in the development of a new campus. For example, in moving to a new campus an older institution may wish to develop residential facilities first, and use a bus for transporting its students back to the older instructional facilities—until such time as the new campus can be fully developed and the old abandoned. Public institutions (within a reasonable commutation zone), on the other hand, will construct instructional facilities, libraries, and administration buildings first because these have priority in educational purpose. As they did centuries ago small institutions may combine several activities in one building, and later separate them as the campus grows. The use of space jointly for classrooms and administration can be well done architecturally as well as operationally. Science lecture hall can be used for the arts. Basic laboratories can be later converted to special laboratories, if advanced thought has been given to ducts and utility requirements. A campus may be built whole, new and entire, such as the Air Force Academy or Foothills College. (See photos pages 218 and 209.)

As an exploration of alternatives Albert R. Wagner of the University of California worked out the following sequence of development for a hypothetical new campus in the lower part of the state. The items are listed in order of priority for the first five years of growth for a University campus whose ultimate size would be 25,000 students in a twenty-five year period. While this list is not a model for imitation it does represent well the cycle of development that many institutions would follow when developing new residential campuses. In order to compare relative magnitudes of each increment gross square footages (gsf) are estimated.

CENTRAL CAMPUS AREA

Corporation yard	34,000 gsf
Residential College (1)	113,000 gsf
Physical Sciences	84,000 gsf
Field House	10,000 gsf
Humanities	117,000 gsf
Library	93,000 gsf
Residential College (2)	113,000 gsf
Engineering	60,000 gsf
Gym and auditorium	175,000 gsf
Residential College (3)	113,000 gsf
Faculty Club	10,000 gsf
Student-Staff Services	25,000 gsf
Biological Sciences	42,000 gsf
Residential College (4)	113,000 gsf
Social Sciences	77,000 gsf
Residential College (5)	113,000 gsf
Natural Resources	42,000 gsf

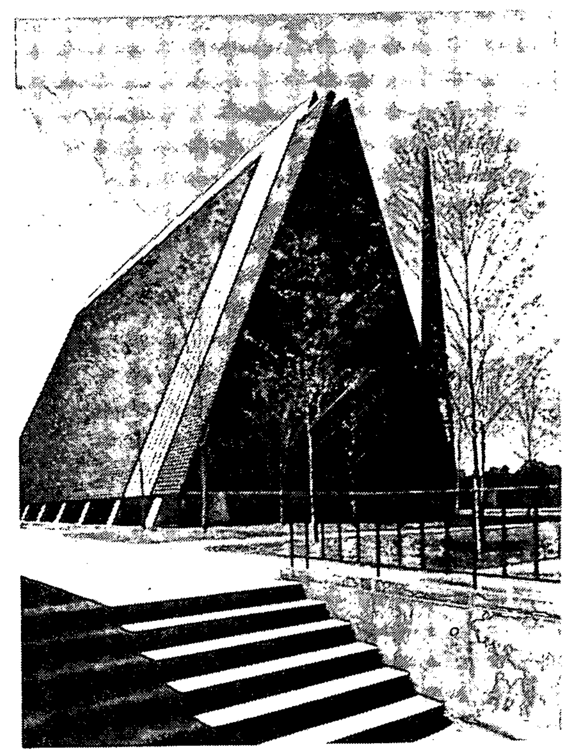
OUTSIDE THE CENTRAL CAMPUS

International Institute	25,000 gsf
Greenhouses	20,000 gsf
Heating plant	10,000 gsf
Engineering testing lab	20,000 gsf
Conservation	25,000 gsf
Animal housing	25,000 gsf
Chancellor's residence	5,000 gsf
Receiving and storage	31,000 gsf
Conference Center	50,000 gsf

SOME EXAMPLES

In the pages that follow a representative selection of new campuses has been gathered to illustrate the variety in solutions and the different methods by which new campuses are being planned and built. The examples also reflect a range of sizes, from the junior college to the university, as well as all climates and all types of support.

Significant new university campuses are being developed in California, New York, and Wisconsin. These have not reached the stage at which they can be published. The plans when completed will represent a major contribution to college and university development and are indicative of that special response which historically is in keeping with the best traditions of American higher education.



2A

lia Senior College (1957)
Fort Wayne, Indiana
Eero Saarinen & Associates, Architects
Landscape Architect: Dan Kiley

The campus was designed for an enrollment of 450 in order to provide suitable training at the junior and senior years for students who plan to enter professional training for the Lutheran ministry. The site consists of 191 acres of gently rolling terrain, bordered on either side by rural lands. Major academic buildings are grouped around a central plaza, with the chapel placed at the highest level. Entering the grounds from the west, one passes between the administration building and classroom buildings along a walk, and up the stairs to the plaza level. Auditorium, student commons, dining hall and classroom buildings are located around the plaza. Three series of dormitories radiate from the center.

Saarinen believed the total grouping should express a tranquil atmosphere of self-sufficiency, not the containment of a monastic enclave, but more like a North European village with the chapel as the dominant center, and the other buildings grouped around the symbol. The pitched roof was evocative of the North European Church, and by using it on all buildings, the group was united in spirit. The pitch on the roofs of all but the chapel was lowered; thus the lesser buildings rise up towards the most significant one.

2A

PHOTO: ROBERT L. BASTRESS

2B

Chapel and plaza area, as viewed from the western approach.

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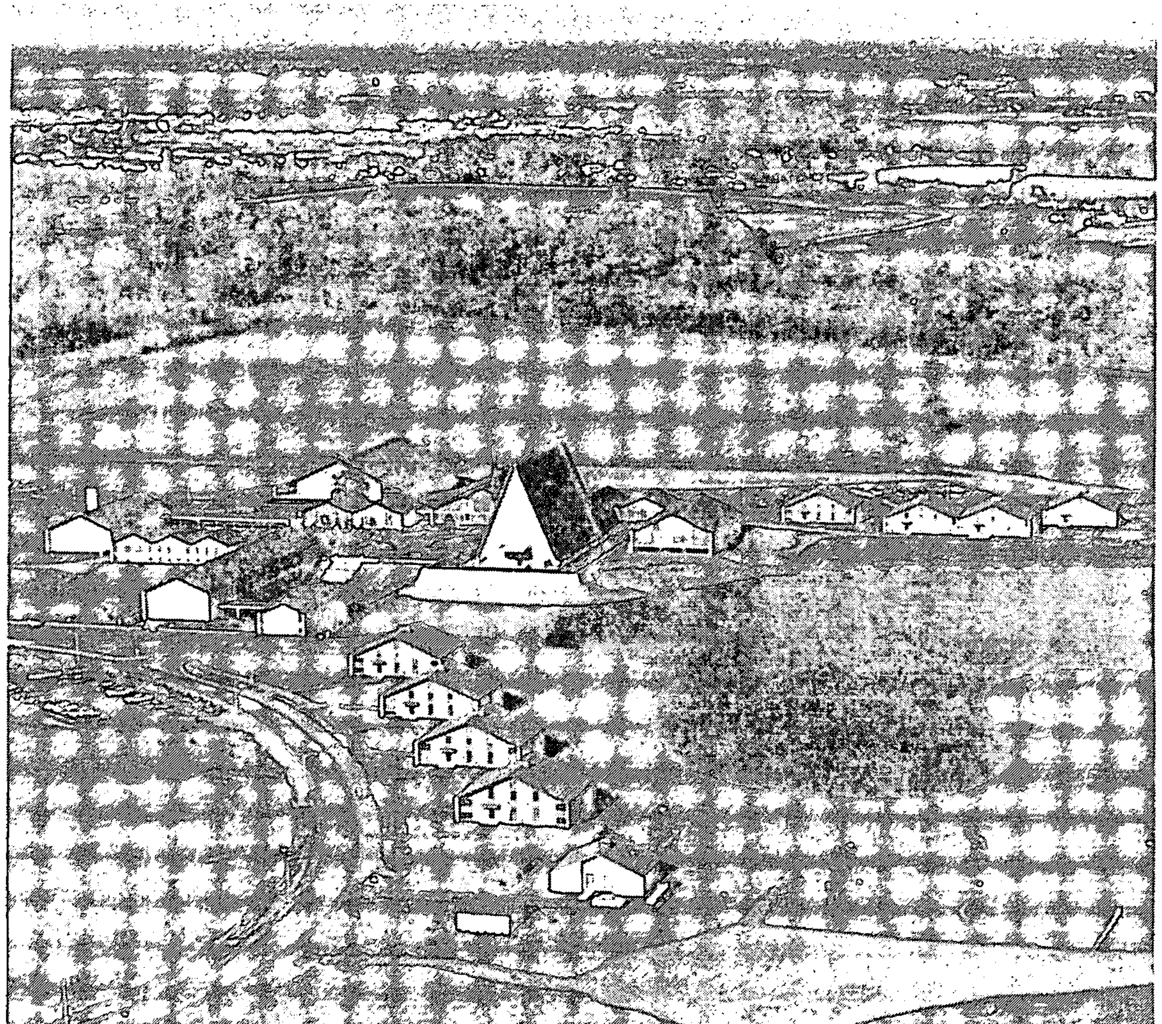


2B

3
San Mateo Junior College (1961)
San Mateo, California
John Carl Warnecke & Associates–Architects
Michael Painter–Landscape Architect
Royston, Hanamoto, Mayes & Beck–
Landscape Architects

3A

The campus is designed for an initial enrollment of 4,000 students. The site is located on a ridge overlooking the bay, above the city of San Mateo. Magnificent views are afforded in all directions. The formal architectural scheme consists of two linear malls, buildings on either side. The malls serve as primary pedestrian circulation elements, and intersect at the point of maximum student activity in front of the library, gymnasium, administration and student center.

Playfields and parking are located below the ridge. Buildings are grouped according to academic affinity.

The basic road pattern is a perimeter loop which at no point crosses pedestrian circulation between buildings. The eastern half of the loop is open only to service and emergency vehicles. Access to the two major parking areas is by means of a four-lane drive. The major public drive is a divided two-lane road which leads toward the visitor parking area and passenger unloading area between the Cultural and Student Centers.

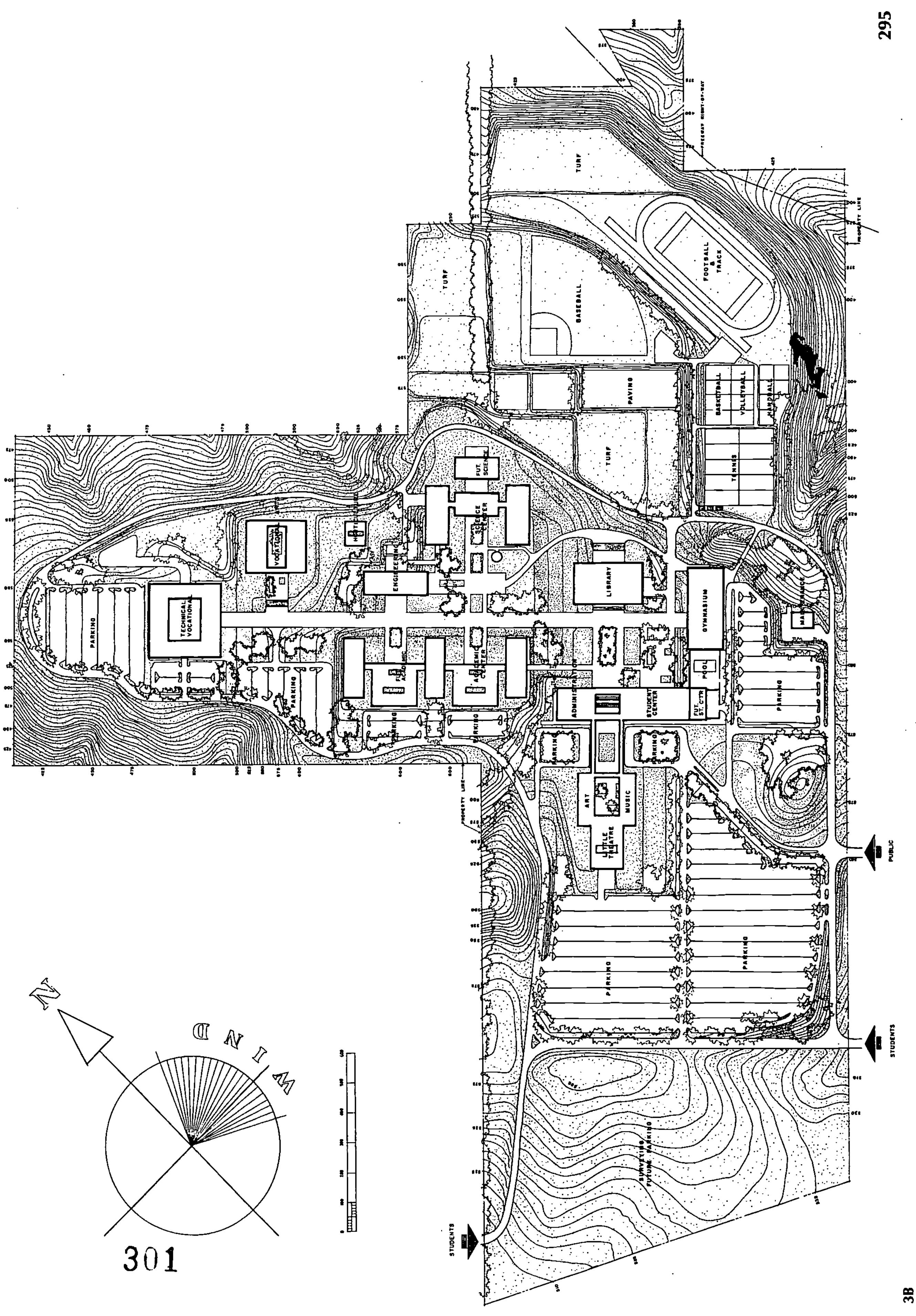
3B

The predominate landscape pattern is an informal one relying heavily on wind and drought resistant trees, shrubs and ground covers. They are grouped to shelter, define and visually enhance open spaces, parking areas, circulation patterns and buildings. In contrast to these naturalistic patterns of evergreen plants are a few rows of regularly spaced trees in the center of the campus. These plantings give a sense of direction and order and follow the main circulation malls. Their regular spaced trunks recall the columns of the buildings and provide a transition between the discipline of buildings and colonnaded courts and the informal surrounding landscape patterns.

Large areas of asphalt paving without any landscaping are most commonly associated with industrial areas, second-rate shopping centers and supermarkets. To avoid this appearance, trees have been used to shelter the parking lots.

These plans are based on basic design considerations: (1) function, convenience and safety; (2) aesthetic, particular care was taken in developing a pleasing transition between the structural rhythm of buildings and colonnaded courts and an informal site with magnificent views; (3) costs, installation and maintenance.

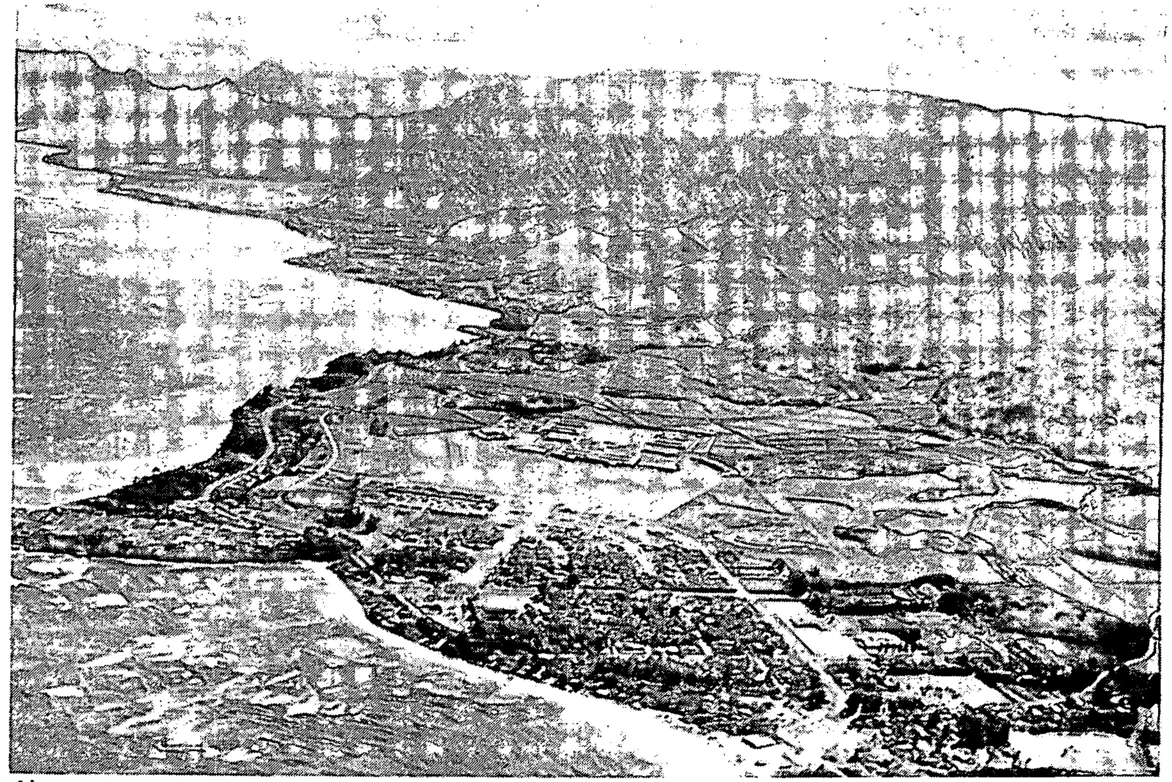
3A


295
TURF
BASEBALL
FOOTBALL & TRACK
PAVING
BASKETBALL
VOLLEYBALL
HANDBALL
TENNIS
FUT. SCIENCE
SCIENCE CENTER
ENGINEERING
HORTICULTURE
VOCATIONAL
TECHNICAL VOCATIONAL
PARKING
LIBRARY
GYMNASIUM
MAINTENANCE
POOL
ADMINISTRATION
STUDENT CENTER
FUT. ST. CTR.
ACADEMIC CENTER
FUT. ACADEMIC
ART
MUSIC
LITTLE THEATRE
PUBLIC
STUDENTS
SURVEYING FUTURE PARKING
PROPERTY LINE
FREEWAY RIGHT-OF-WAY
WIND
N
3B

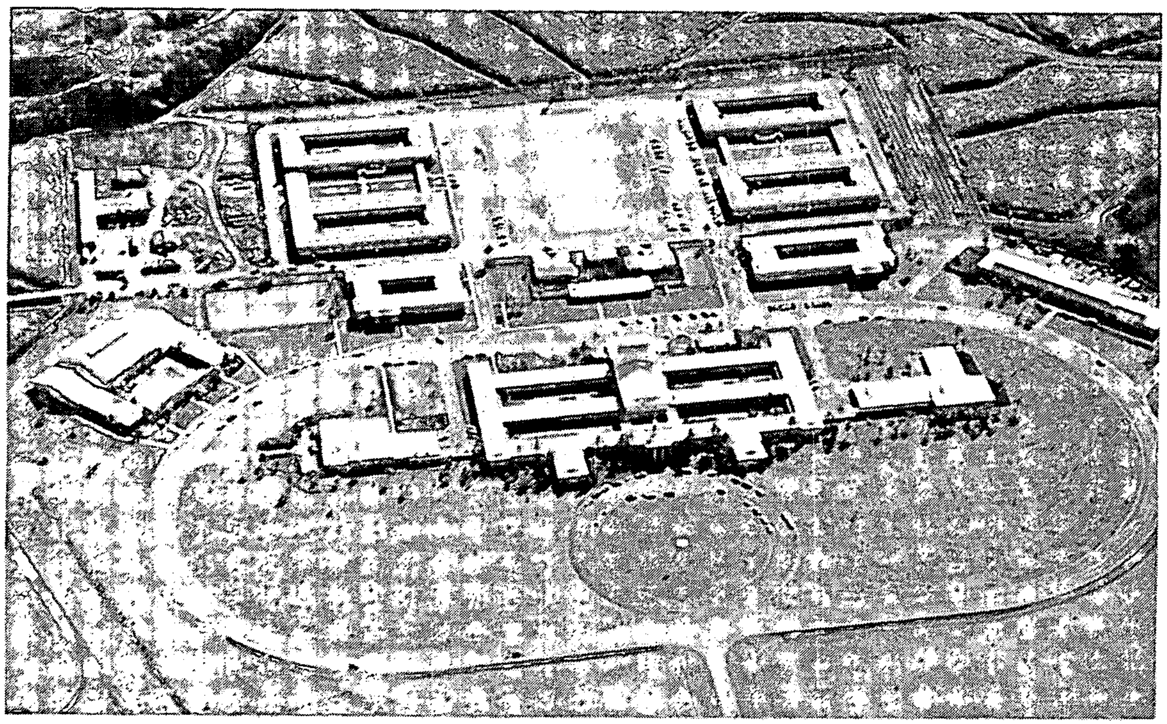
4
The Church College of Hawaii (1955)
Oahu, Hawaii
Co-educational
Sectarian
Spring 1962 enrollment: 500
Architect: Harold Burton

4A

Located on the northern end of the Island of Oahu, the 70 acre campus was planned and constructed in its entirety in five years by 30 skilled and 60 non-skilled building missionaries of The Church of the Latter Day Saints. To take advantage of the availability of the labor, the college was constructed to its long-range size, about 1,000 residential students. Total area under roof in the twenty buildings is 218,718 square feet, a compact physical plant.



4A



4B

4B

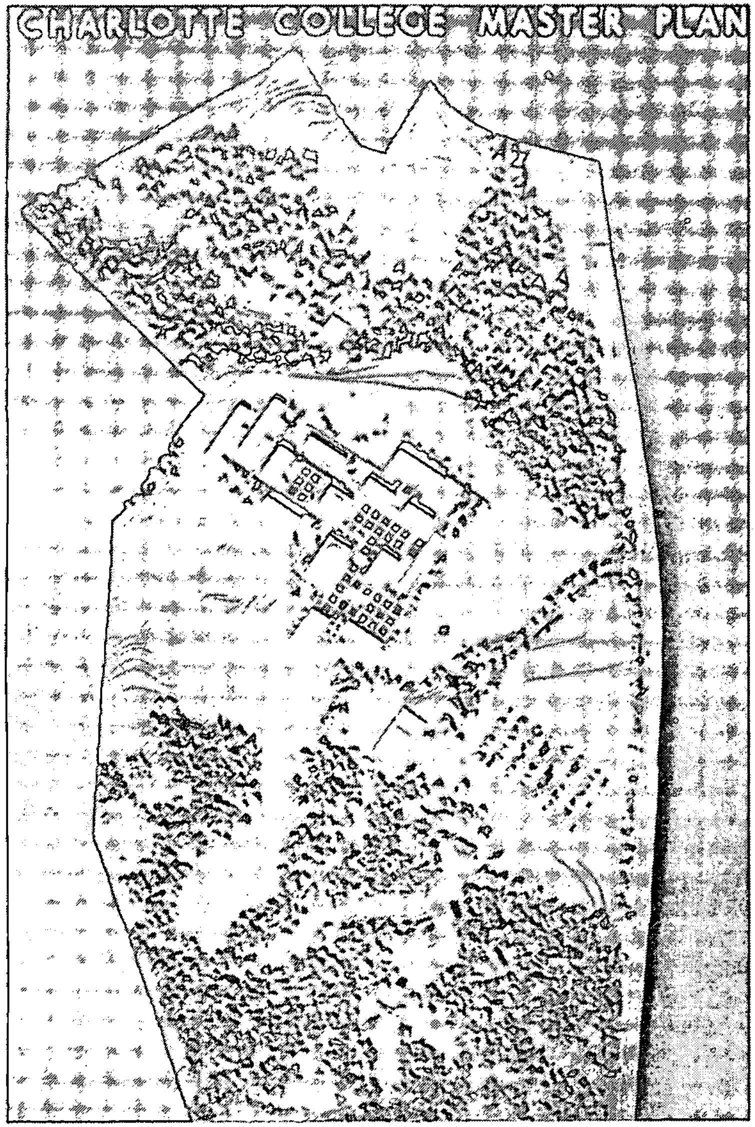
Central building consists of ten units built around four large patios and connected by covered walks. Center unit of central building contains the college auditorium. Surrounding wings are devoted to classrooms and offices. Library is to the right of the central building, cafeteria to the left.

The second ring of white roofed buildings from left to right are: swimming pool and gymnasium, women's dormitory, president's and deans' homes, men's dormitory and industrial arts building.

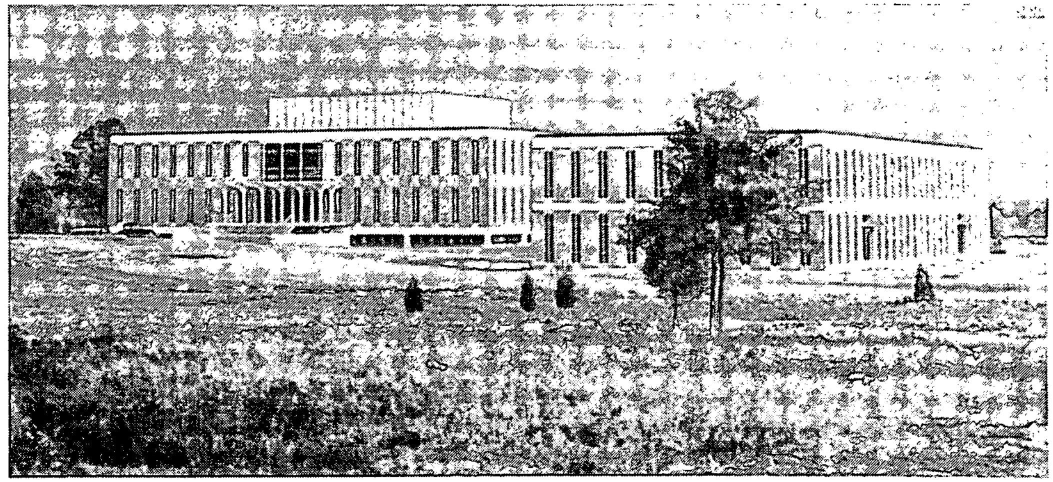
Upper left in photo: Plant maintenance and the original building missionaries quarters. Quadrangles on either side of the tennis courts are (left to right): women's dormitory and men's dormitory. Careful cost accounting records, kept on the residential buildings, indicated buildings were constructed at one-half the contract cost per square foot for that type of building in Hawaii.

PHOTOS COURTESY: CHURCH COLLEGE OF HAWAII

303



5A



5B

5
Charlotte College (1961)
Charlotte, North Carolina
Co-educational
Public
Spring 1962 enrollment: 583
Master plan and buildings designed by:
A. G. Odell, Jr., and Associates, Architects

5A

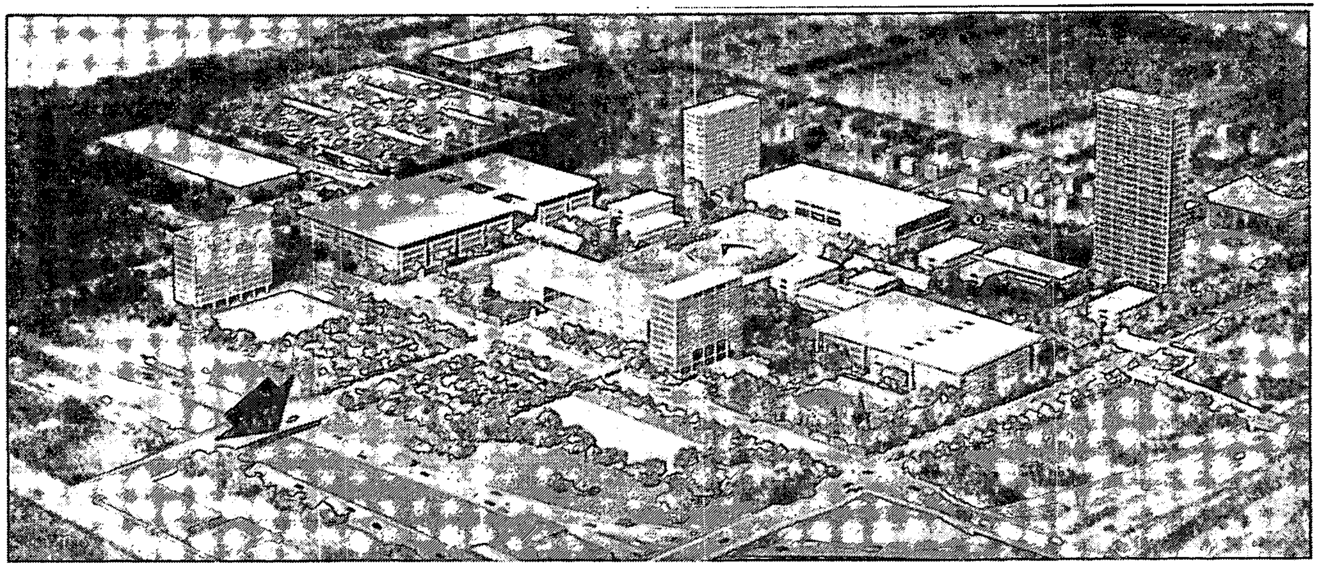
Started as a night-school offering vocational courses to the community in the local high school, Charlotte College's expanded educational role and newly acquired status as an accredited junior college led to the preparation of a new campus plan shown in photo.

In anticipation of growth into a senior college, the master plan established sites for future (but unknown) expansion, and organized probable building areas into an overall campus design. This was used as a guide, in locating the first two buildings.

The first stage buildings had to be designed to accommodate all college functions, but at the same time be capable of gradual change into a special use building. Since the buildings would be the only structures on campus for some time, they had to carry the symbolic message of a vigorous and growing academic tradition.

5B

As seen in photo, the engineering science building (left) and liberal arts building (right) were sited in order to begin an academic quadrangle, which can be seen in the center of the master plan grouping. Because of the climate and the desire to operate the physical plant day and night and all-year round, the buildings are air-conditioned. First two buildings contain 32 classrooms and laboratories, a temporary library, a temporary administrative wing, and 25 offices for faculty members. Total cost of first stage development: $1.4 million.



6A

6

The University of Illinois at Congress Circle (1962)
Chicago, Illinois
Architects: Skidmore, Owings, & Merrill

6A

The new campus is being built at the confluence of two major expressways and a rapid transit line in the heart of the city. It will fulfill the need for a major urban state-owned four year school for those who must live at home and work their way through school. (60% of the state's population is in metropolitan Chicago.) Phase I of the campus development will provide facilities for 9,000 students and 2,000 cars. Phase II expansion will serve an enrollment of 20,000 and provide 6,000 parking spaces.

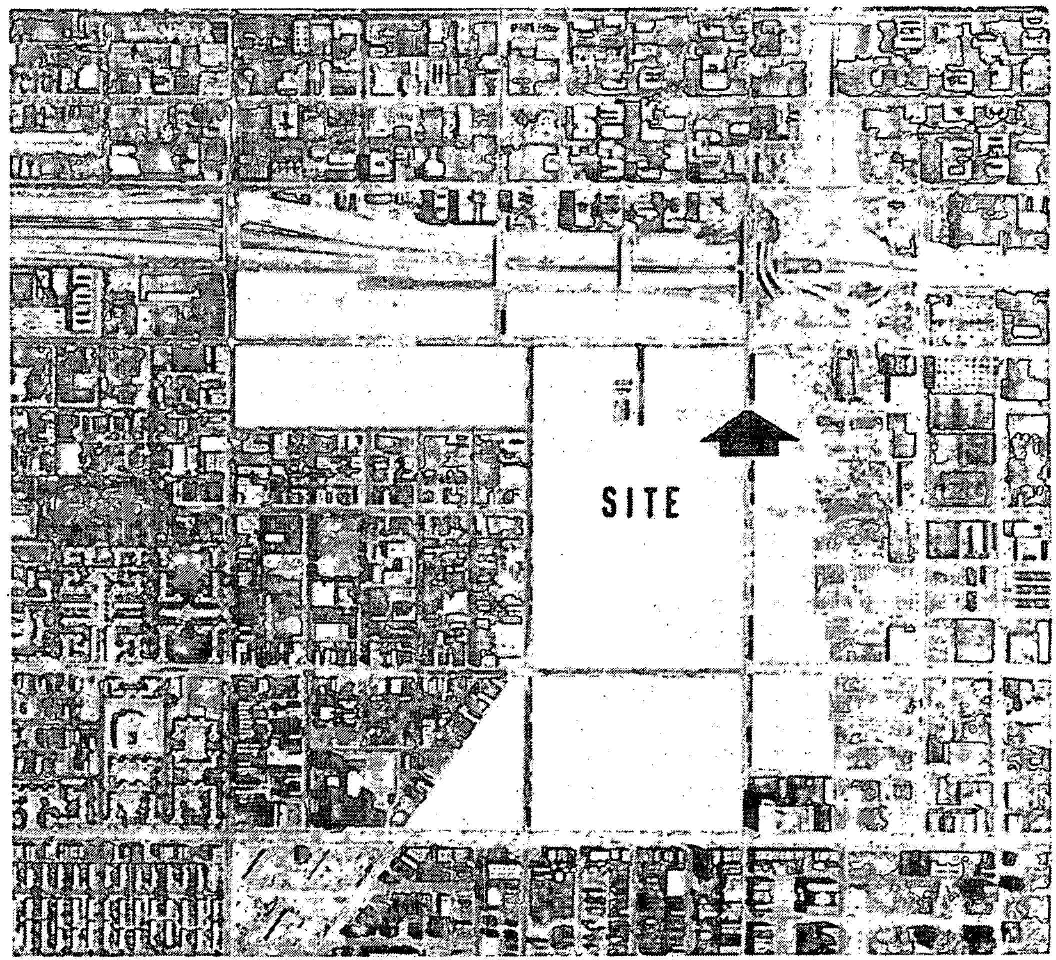
6B

The master plan concept was guided by the requirements for flexible buildings, economy in construction and great interchangeability. Classrooms and laboratories, drawing heavy traffic, are kept in separate low-rise non-elevator buildings. The former require 9 foot ceilings, the latter, 12 foot ceilings because of utilities. Seminar rooms, offices and other uses which will attract lighter traffic will be placed in high-rise buildings to make maximum use of land.

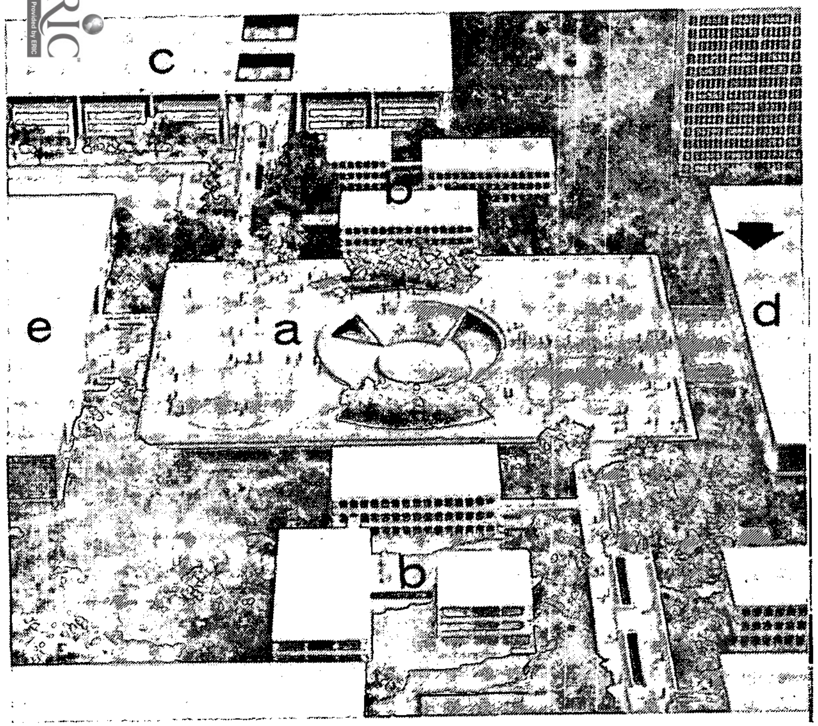
An express walkway will link most of the buildings at the second story level. Special pedestrian ways will connect the rapid transit station, major automobile access points, and the center of the campus.

High rise buildings on the perimeter are surrounded by large open-spaces. Inside the campus lower-rise structures are clustered to make the center a self-contained entity. Urban scaled planting enrichens the design fabric and complements the connecting links between use areas.

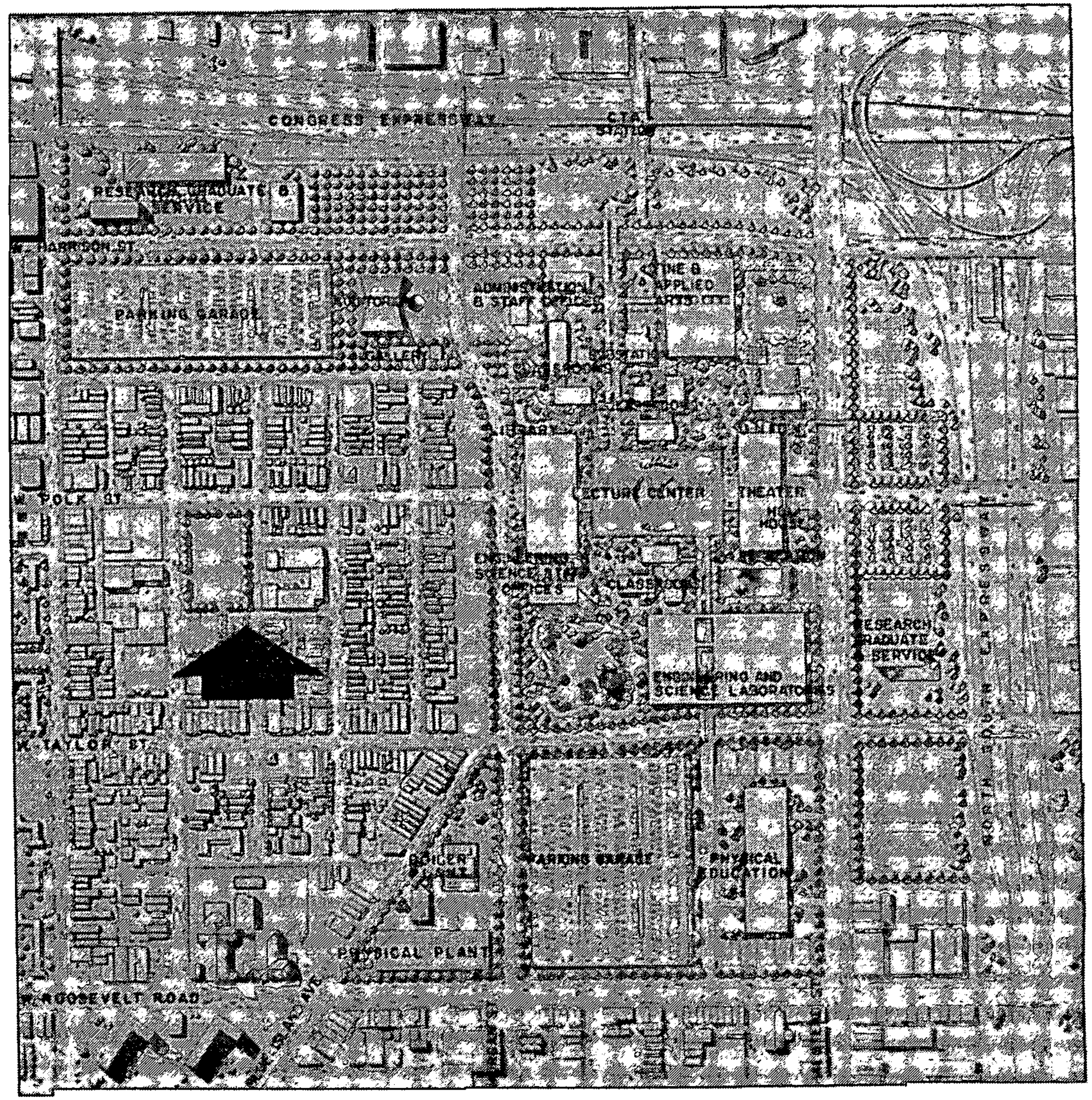
LANDSCAPE CONSULTANTS: SASAKI, WALKER & ASSOCIATES, INC.
ALL PHOTOS: HEDRICH-BLESSING



6B

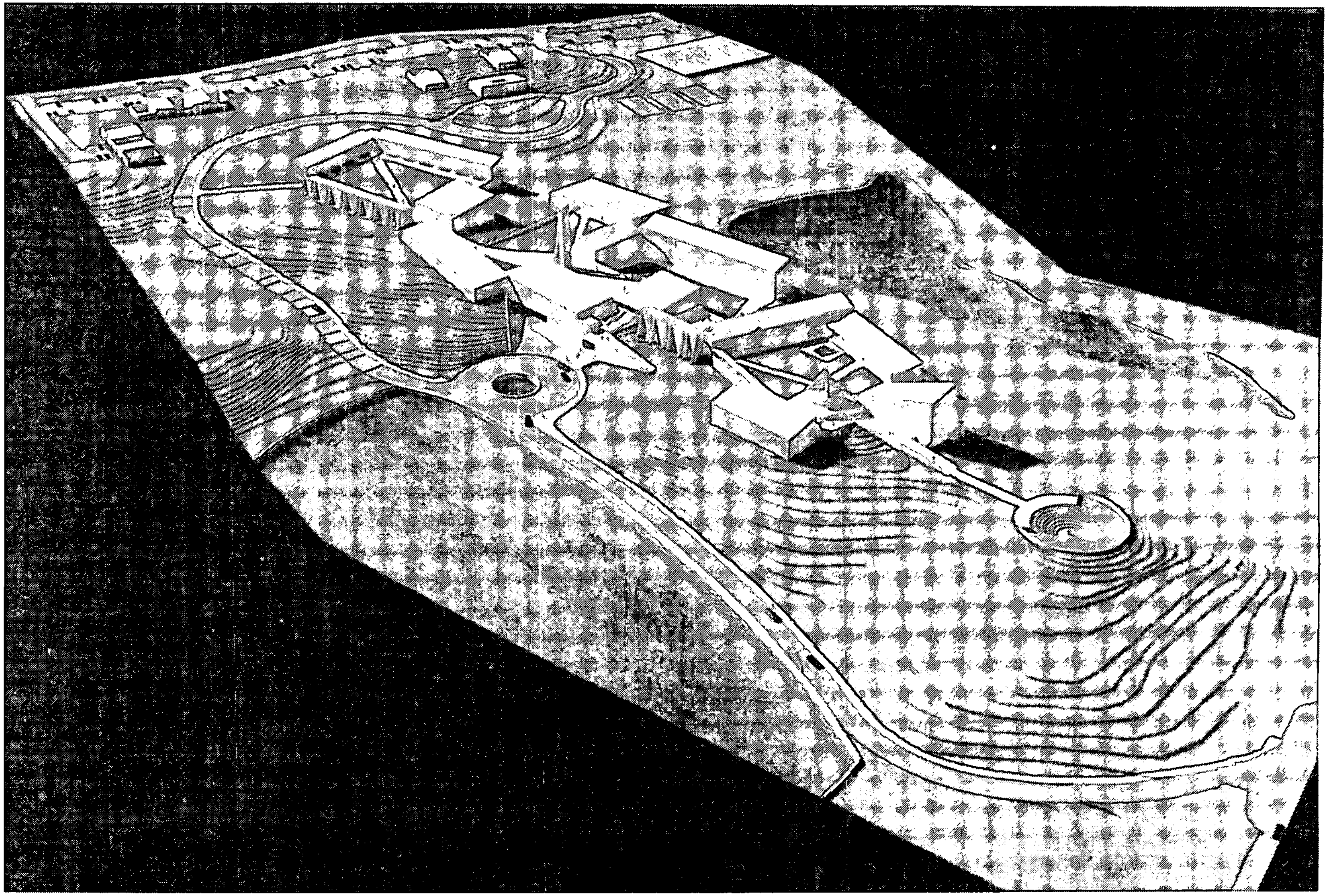


6C



6D

6C
Central campus facilities
a. Lecture Center
b. Classrooms
c. Engineering and science laboratories
d. Library
e. Theatre
6D
Overall development plan for 9,000 student campus.



7A

7

Northern Baptist Theological Seminary (1961)
Hinsdale, Illinois
Harry Weese and Associates, Architects

7A

Model of master plan at end of Phase Two construction

The master plan divides the 30 acre site into two campuses, to be constructed in two stages. Stage one, shown above, is the graduate divinity school for 120 students. Stage two (outlined buildings) will be an undergraduate college of 120 students. Both divinity school and college share a common core area: administration building and student commons.

PHOTO BY: HEDRICH-BLESSING

7B

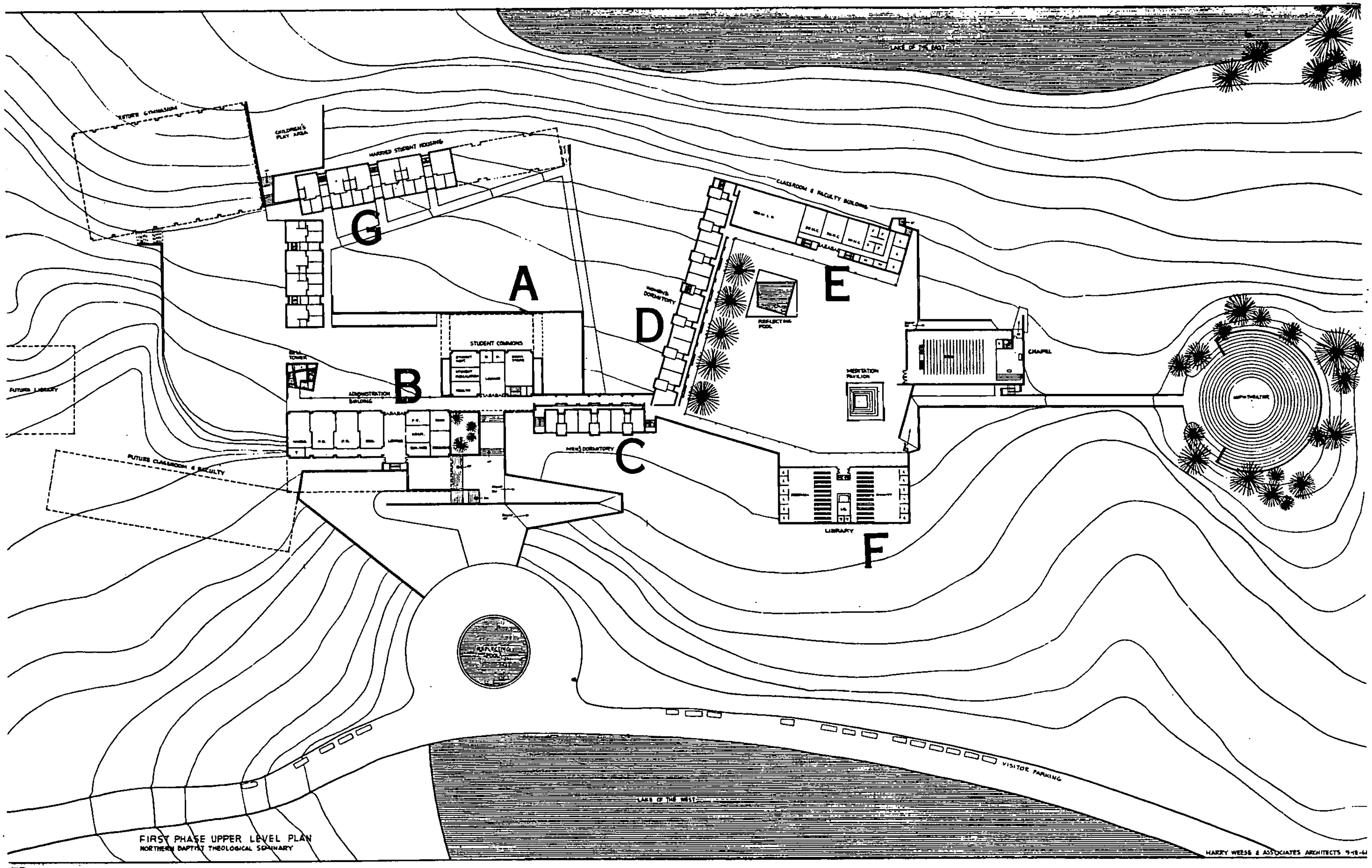
Stage one construction will consist of:

A. Student commons
B. Administration building
C. Men's dormitory
D. Women's dormitory
E. Classroom and faculty building
F. Library

Later construction:

G. Married student housing
H. Chapel

Estimated costs first stage: $1,650,000
Completion date: Fall, 1963



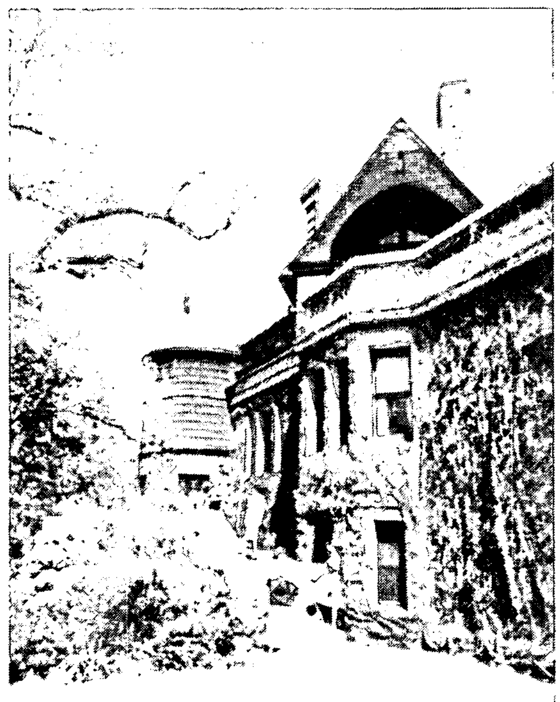
FIRST PHASE UPPER LEVEL PLAN
NORTHERN BAPTIST THEOLOGICAL SEMINARY

7B

LEGEND:

A* MAIN HOUSE - ADMINISTRATIVE AND STUDENT ACTIVITIES
B LIBRARY AND ART CENTER
C DINING COMMONS
D* COACH HOUSE - MUSIC HOUSE
E* GARAGE - SCIENCE CENTER
F CLASSROOM BUILDING
G STUDENT RESIDENCES - APPROXIMATELY 150 STUDENTS PER BUILDING
H FRENCH HOUSE
I SPANISH HOUSE
PERFORMING ARTS CENTER
K SWIMMING POOL
L* INFIRMARY
M DEAN'S RESIDENCE
N* FACULTY HOUSING
O PLAYFIELDS
P TENNIS COURTS
Q MAINTENANCE DEPARTMENT
R CHAPEL

8A



8B

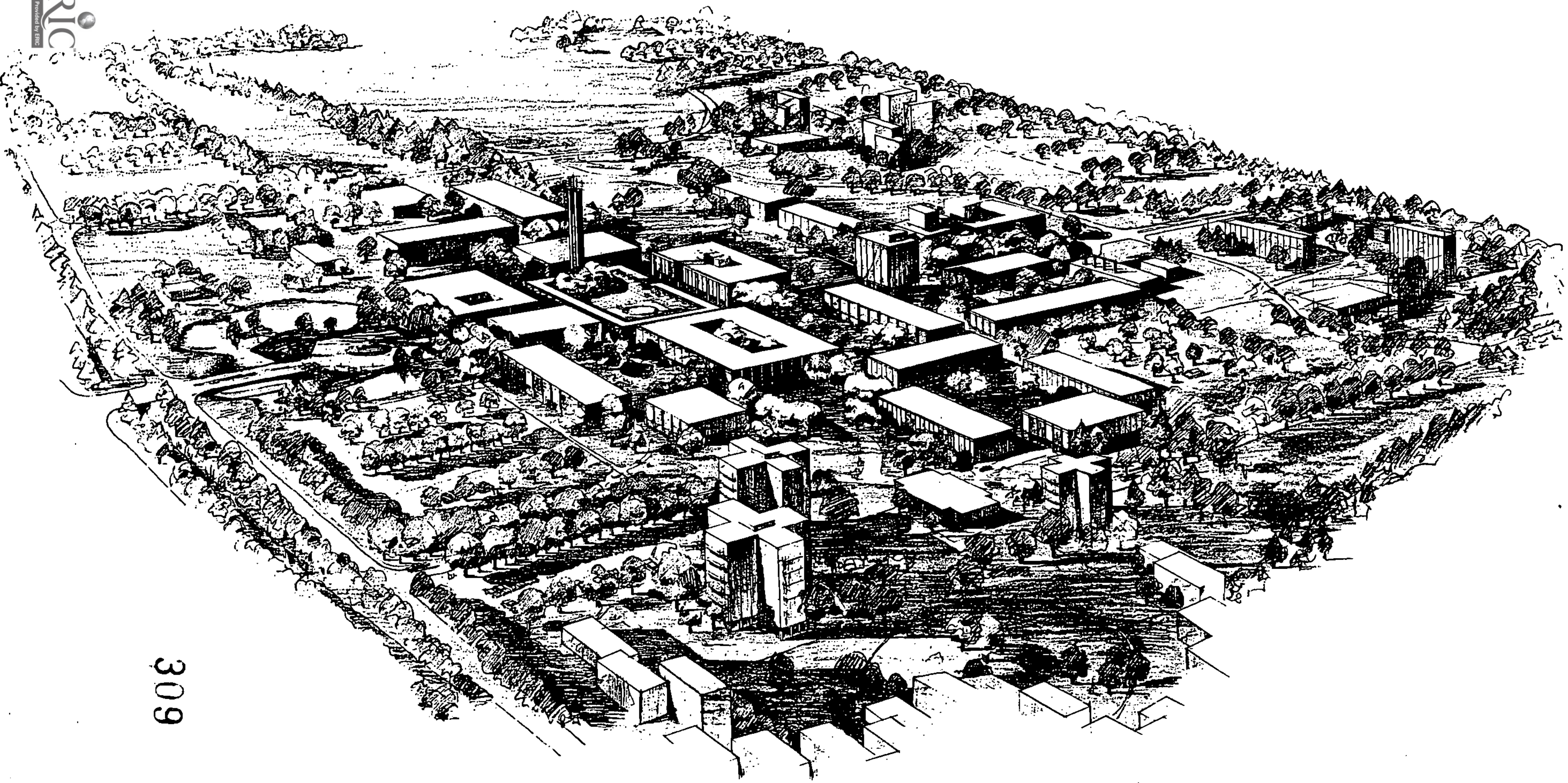
8
Pine Manor Junior College
Chestnut Hill, Massachusetts
Women
Private
Spring 1962 enrollment: 303

8A
Preliminary Development Plan (1961)
Prepared by Sasaki, Walker & Associates, Inc.

8B
Main House to be converted into Library and Art Center

In the denser areas of the Eastern seaboard the sizeable acreage of raw land needed for developing a new campus for a private college is not easily assembled. One solution that has proven successful is the acquisition of large private estates and their conversion to institutional uses. Pine Manor Junior College has made plans for just such a move. The major design features of the preliminary development plan above are:

1. Creation of distinctive campus land-use areas: residential, recreational, academic.
2. The buffering of the entire campus from its environs.
3. The control of automobile traffic by limiting access to the campus and constructing a loop periphery service road around the central campus area.
4. The conversion of existing buildings into campus uses.
5. The organization of existing buildings and proposed buildings so that construction can be staged to meet the schedule for moving from the old campus.
6. Preservation of existing site amenities.



9A

9

Sonoma State College Master Plan (1962)

John Carl Warnecke and Associates

The campus is located near the town of Cotati, about fifty miles north of San Francisco.

9A

This master plan (Phase I and ultimate phase, shown next page) was prepared to test the site's capacity to grow from a FTE enrollment of 200 to a FTE enrollment of 12,000, the latter figure expected to be reached by 1985.

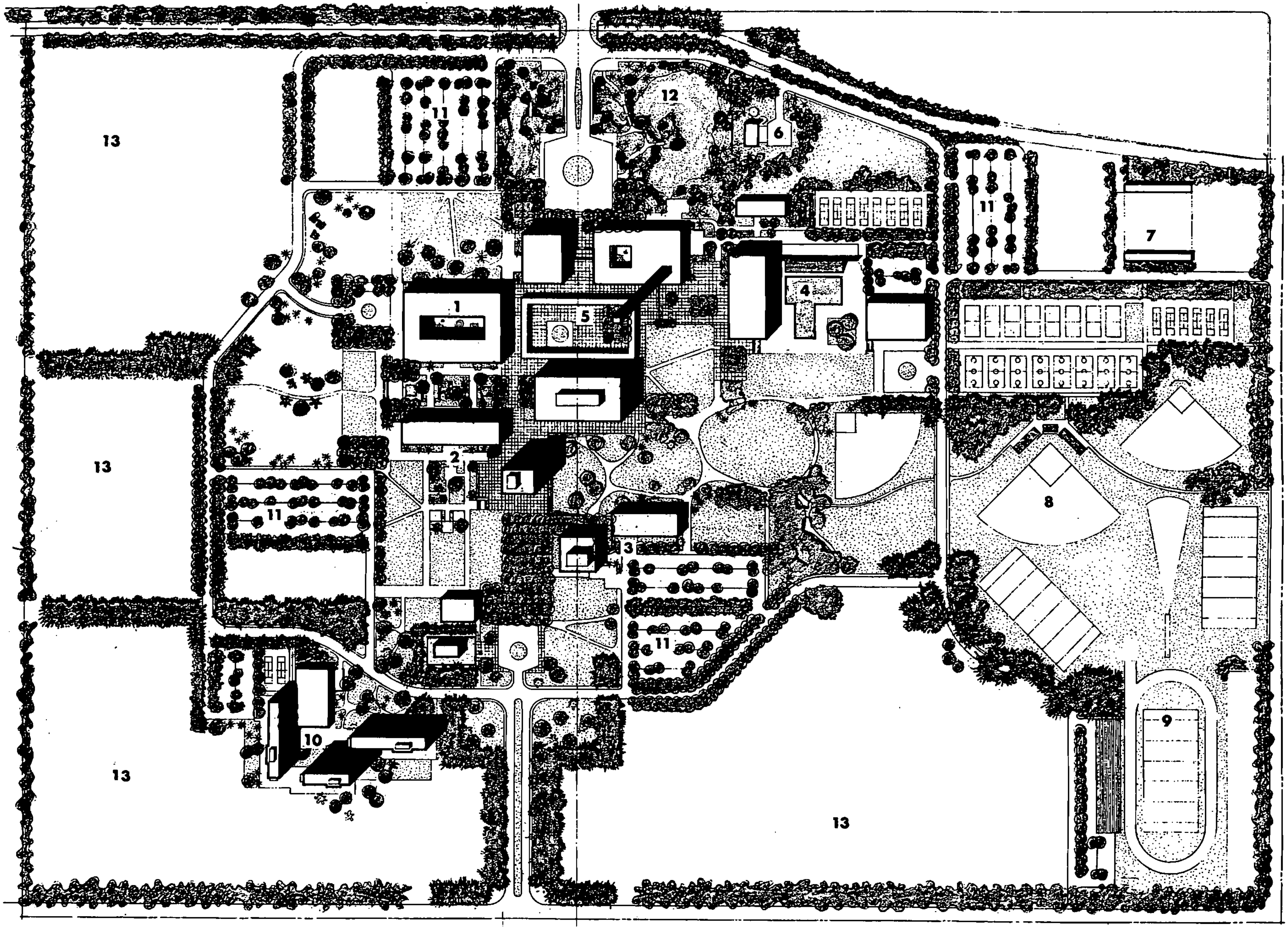
The ultimate stage growth program included requirements for 3,000 housing units and parking for 8,500 automobiles.

Slow growth rates made it imperative that the development plan provide for a finished environment at all stages of completion. Phase I plan established locations for student housing, recreational athletic area, and an academic core and other campus uses (see next page). Proposed academic buildings were grouped around outdoor courts, to allow expansion in all directions. A loop circles the academic area, with first phase parking located inside. Ultimate parking will be handled by large lots on the periphery.

Ultimate stage student housing has been separated into three groups with facilities for men, women and married students.

Because the site is flat and relatively uninteresting, the proposed landscape development is designed to hold the various use areas together, as well as create a sequence of "soft" and "hard" outdoor spaces. The latter will include a green finger connecting the playfield areas and central campus. The central campus itself will consist of smaller outdoor areas framed by buildings and buffer planting. These areas will be given special treatment by use of fountains, pools, pavings, benches, and planting. The campus center will be given a vertical accent by way of a campanile, which marks the front door of the campus.

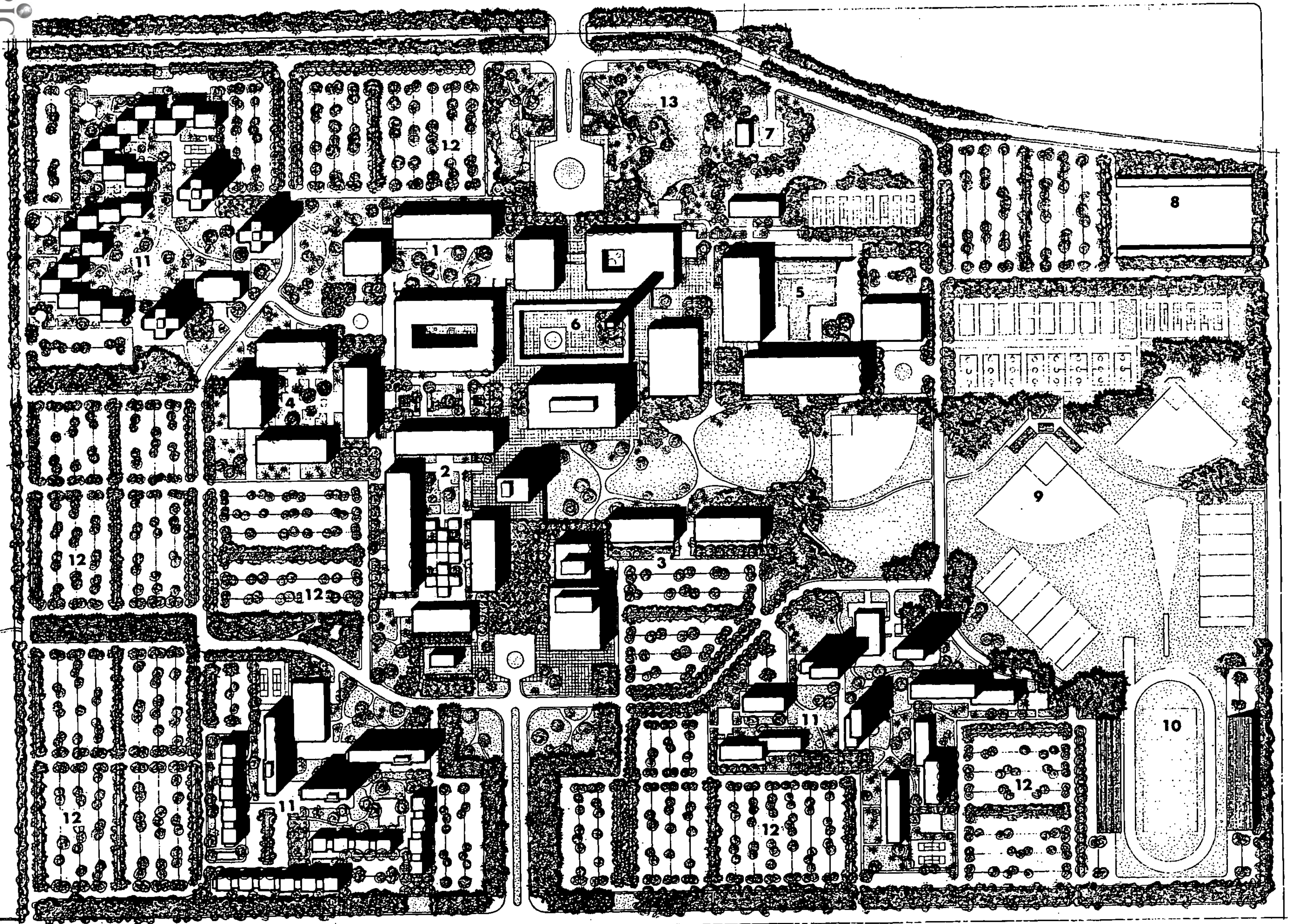
The plan structure is obtained by linking together use areas with landscape elements. It is expected that an overall unity will be reinforced through use of materials in buildings, and at the same time individual parts will have a strong image of their own by varying the treatment of the ground plane on which they are centered.



1. ACADEMIC CENTER
2. SCIENCE CENTER
3. ARTS CENTER
4. PHYSICAL EDUCATION CENTER
5. CAMPUS CENTER
6. CAMPUS RESIDENCE
7. CORPORATION YARD
8. ATHLETIC FIELDS
9. STADIUM
10. STUDENT HOUSING
11. PARKING
12. LAKE
13. FUTURE USE

9B

PHASE I. CAMPUS MASTER PLAN



1. ACADEMIC CENTER
2. SCIENCE CENTER
3. ARTS CENTER
4. UNASSIGNED CENTER
5. PHYSICAL EDUCATION CENTER
6. CAMPUS CENTER
7. CAMPUS RESIDENCE
8. CORPORATION YARD
9. ATHLETIC FIELDS
10. STADIUM
11. STUDENT HOUSING
12. PARKING
13. LAKE

9C

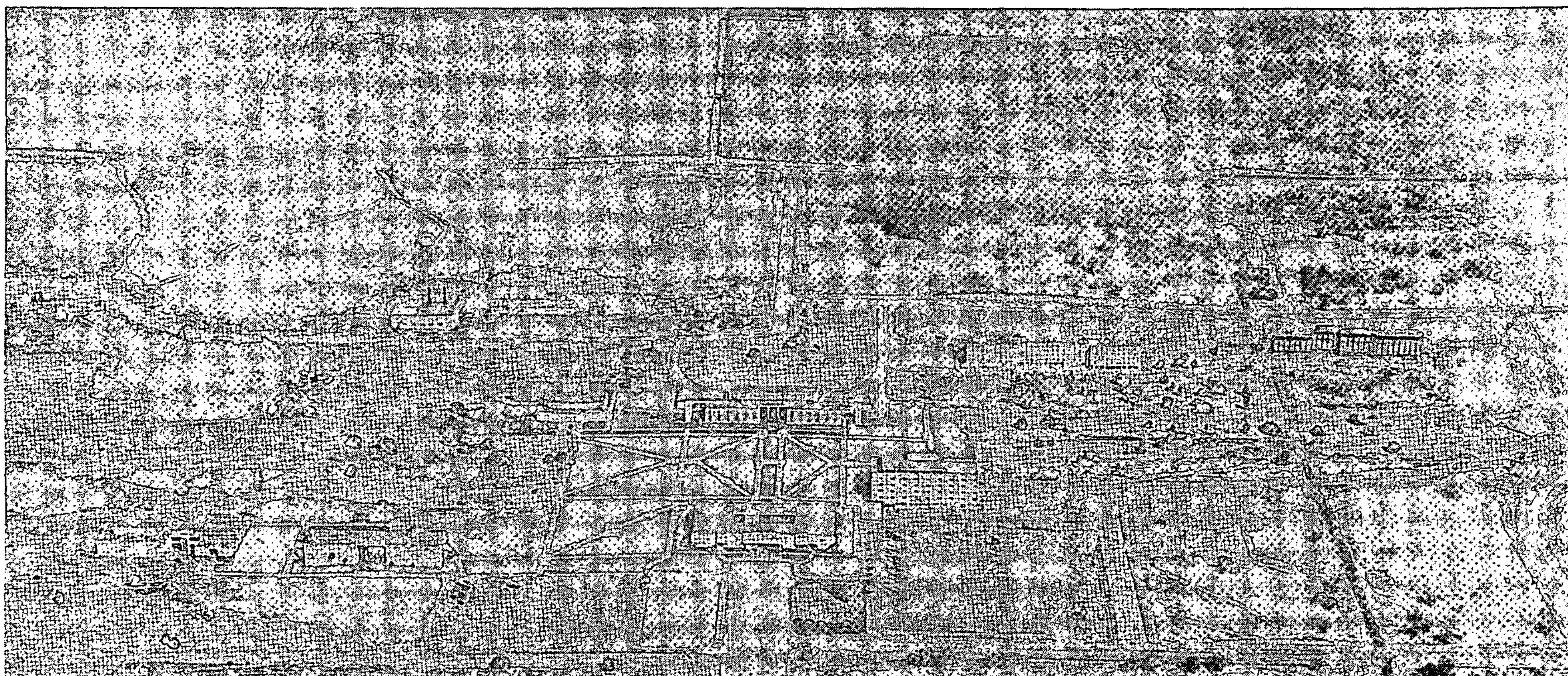
ULTIMATE CAMPUS MASTER PLAN

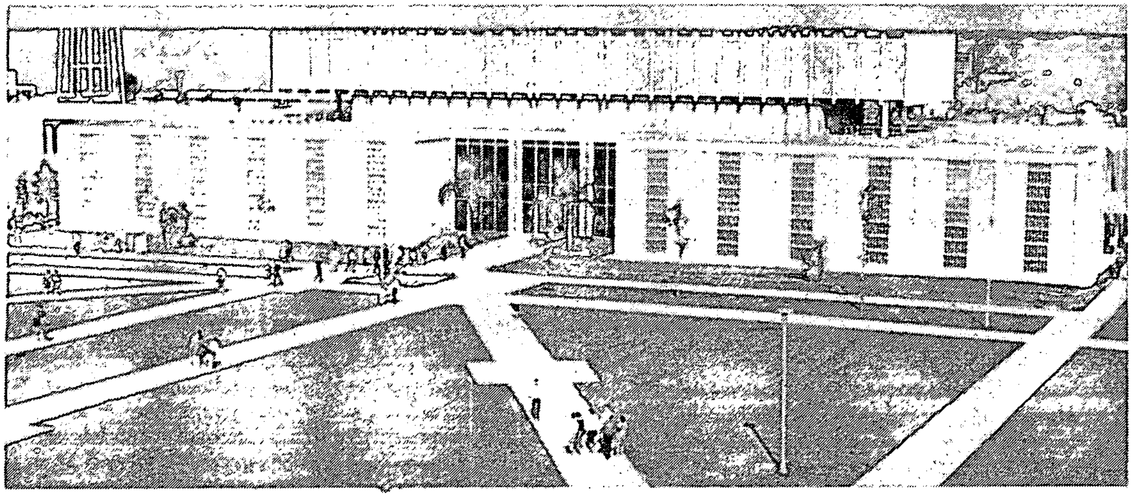
10
University of South Florida (1958)
Tampa, Florida
Co-educational
Public Support
Spring 1962 enrollment: 1,983
Development plan (1958) by Jefferson Hamilton

Florida's population is expected to double by 1970. Much of this growth will occur in urban areas. Because many of the state's existing institutions of higher learning are located in sparsely settled districts, a new state university was authorized (1957) for the booming Tampa metropolitan region.

A 1,700 acre site was selected just north of the city. The basic development plan calls for centers of related academic disciplines to be constructed on either side of a "green spine." Academic expansion occurs outward from the spine. A peripheral road encloses the central precinct. Housing, athletic fields and other non-instructional facilities are located in the second ring of land-uses, surrounding the central campus. The present enrollment is expected to grow to 10,000 students in eight years.

10A
Air-view shows the five major buildings comprising the campus core as they appeared in the spring of 1962. Three principles were followed in designing the facilities. First, all buildings would be constructed for their long-range capacity, but in such a fashion that interim uses – particularly general classroom needs – could be accommodated. Secondly, the key common buildings such as the library, administration building and union would be constructed early in the program so as to complete the center of the campus. Thirdly, buildings were designed for year-round use. Because of local climate this meant well insulated, air-conditioned buildings, with a minimum of windows and proper protection from the sun. Six architects from five cities worked simultaneously on the development in order to deliver all plans in twelve months. Through the architectural coordinator, Guy C. Fulton, a fairly unified feeling among the buildings was achieved by expressing the vertical structural members, and sunshade controls in white concrete, and exterior walls in beige clay brick.
PHOTO BY TAGGART


10A

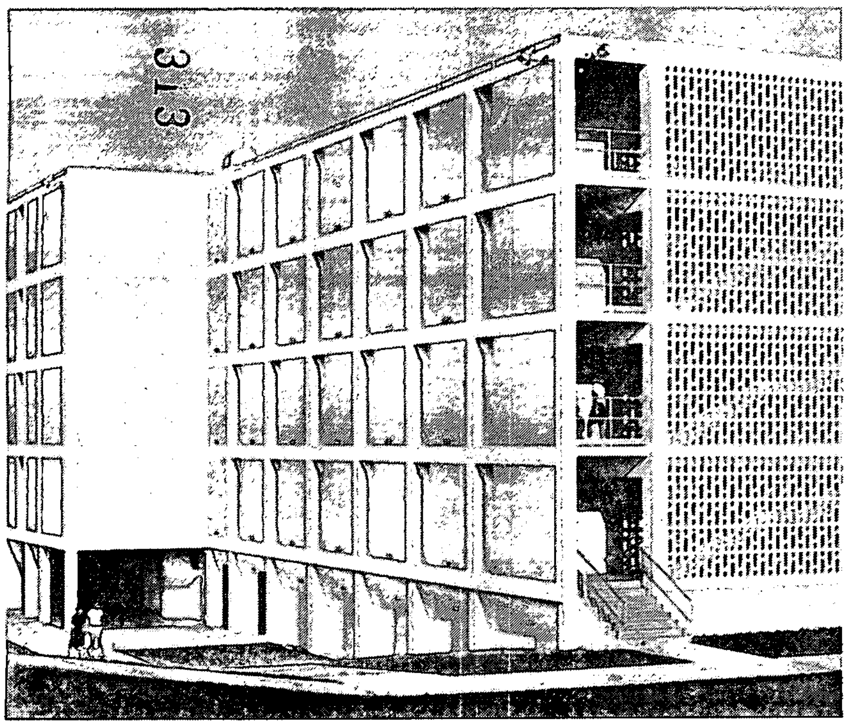


10D

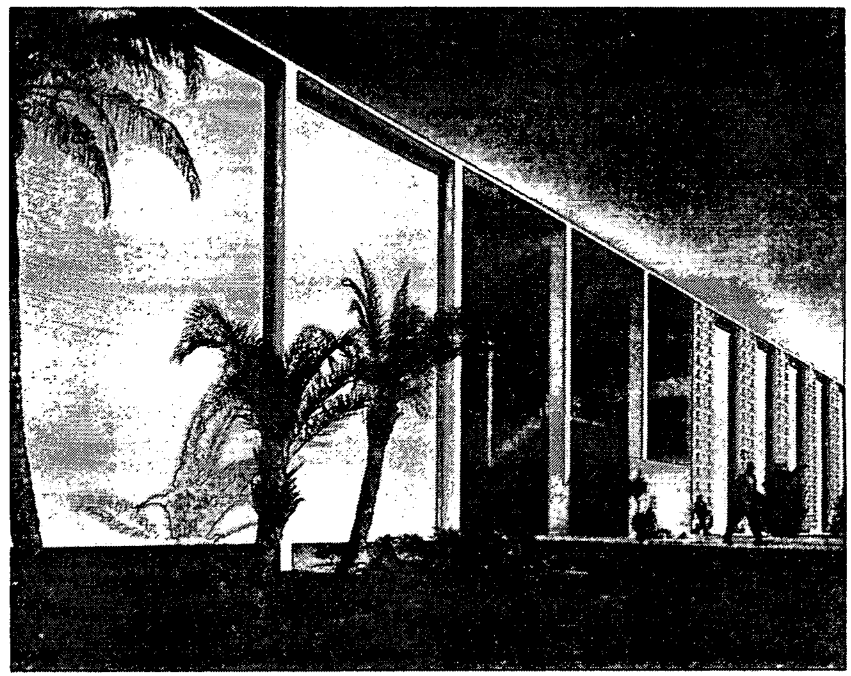
10B
Residence Hall
Forrest N. Kelley, Jr., Architect

10C
Chemistry Building
Mark Hampton, Architect

10D
University Center
Robert M. Little, Architect
PHOTOS BY: NEWS BUREAU, UNIVERSITY OF SOUTH FLORIDA



10B



10C

ACKNOWLEDGMENTS:
This book is a synthesis of current events which I have selected to weave together as a graphic outline of a flexible approach to campus planning. The synthesis is neither gospel nor cookbook. The techniques described should be selectively applied and adjusted to the changing situations which are unique to the individual institutions. The results that can be expected from the design of structure (planning) are different from those that can be expected from the design of content (architecture). Ideally, of course, one activity melds into the other.

I have not attempted, however, in this book to develop a set of detailed procedures for producing good programs for the architecture of individual buildings. In focusing on campus planning, I have used buildings and building designs as specimens of educational concepts and institutional attitudes. The mixture of good and bad is deliberately done for purposes of comparison.

As a number of people have kindly answered my requests for case examples, I have recapitulated above one of my major themes so they may understand the logic of my selection. The help of those who responded and are not published herein is thus gratefully acknowledged first.

As noted in the captions, most of the illustrations were provided by the institutions and their architects and planners. Permission to publish them has been given in the spirit of free inquiry, which is central to the colleges and universities they represent. Photographs without a credit line were taken by the author.

In every enterprise of this kind there are participants who give special impetus to the completion of the tasks the author has set out for himself. The following in no way should be held responsible for the conclusions I have drawn, but I do thank them for their special contributions:

Albert R. Wagner, Charles D. Tefft, Carl C. McElvey of the University of California; James W. Clark, Ohio State University; K. C. Parsons and Ben Mintz of Cornell University; O. Robert Simha, Massachusetts Institute of Technology; Harold Taubin, University of Pennsylvania; Harry Sanders and Oscar F. Nelson, Stanford University; Leo Jakobson, University of Wisconsin; Glenn W. Wegner, Washington State University; Martin Brixen, University of Utah; Harold Goyette, Harvard University; Edward S. Gruson, Harvard University Medical School; John R. Ellingson; F. X. Tuohey, Wayne State University; Garrett Eckbo, Robert Royston, Lawrence Halprin, Sydney Shurcliff, William J. Johnson, Leonard Currie, William W. Wurster, Vernon DeMars, Gene Murphy, J. Ambler Johnston, Walter Netsch, Hugh Stubbins, Norman Fletcher, H. Brook Haas, Victor Olygay, Robert L. Geddes, Cass S. Wadowski, Herbert H. Swinburne, Norman C. Zimmer, John Adelberg, Richard Galehouse, James E. Robinson, George Yost, Stuart O. Dawson, Paul G. Gardescu, and Nancy Perkins and Klaus Kleinschmidt of Cambridge Acoustical Associates.

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Helen D. Bullock and Terry Morton, National Trust for Historic Preservation; Thomas M. Schmid, The Association of American University Presses; Leon E. Seltzer, Stanford University Press; Robert M. Hyde, Clark University; William C. Wheadon, National Council of Research Administrators; Lorraine Lyman; Donald C. Bulat; Henry L. Doten; Dr. Algo D. Henderson; Dr. E. Eugene Higgins and W. Robert Bokelman, Division of Higher Education, Department of Health, Education, and Welfare; Patrick Lee Dober; Dr. Richard H. Bolt, National Science Foundation; W. S. Kinne Jr., University Facilities Research Center.

BIBLIOGRAPHIC NOTES
When I began this book I noted that many of the hard-cover sources which one would expect to use as major reference works were (with the exception of histories of higher education) hopelessly dated. The bulk of what proved to be current and useful information appeared in articles and planning documents—the latter being reports, memoranda, plans and brochures of limited circulation and rather specialized content. In the footnotes at the end of each chapter I have indicated those sources which finally had direct bearing on the points I wanted to stress. For readers searching additional information I recommend *An Annotated Bibliography of University and Medical Center Planning and Development*. Compiled by Professor Kermit C. Parsons, Cornell University, it has more than five hundred citations. It can be obtained from:

Exchange Bibliographies
Council of Planning Librarians
6318 Thornhill Drive
Oakland 11, California

The issues of design, which I raise and settle only in the largest sense, should be of interest to all readers. Fuller insights into my own views may be gleaned from the writings of Martin S. James, Lancelot L. White, Sigfried Giedion, and Gyorgy Kepes. For those concerned with "practical matters" I recommend Kevin Lynch's *Site Planning* (The M. I. T. Press, 1962) and John O. Simonds' *Landscape Architecture* (F. W. Dodge Corporation, 1961). Both have pertinent bibliographies which can be used as points of departure into specific problems and exemplary solutions.

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